The Illustrated Dictionary of Gardening

An Encyclopædia of Horticulture

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*** START OF THE PROJECT GUTENBERG EBOOK THE ILLUSTRATED DICTIONARY OF GARDENING, DIVISION 1; A TO CAR. ***

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[See larger version]

THE

ILLUSTRATED

DICTIONARY OF GARDENING,

A PRACTICAL AND SCIENTIFIC

Encyclopædia ✣ of ✣ Horticulture

FOR

GARDENERS AND BOTANISTS.

EDITED BY

GEORGE NICHOLSON,
Of the Royal Botanic Gardens, Kew.

ASSISTED BY PROFESSOR J. W. H. TRAIL, A.M., M.D., F.L.S., IN THE PARTS RELATING TO INSECTS AND FUNGI; AND J. GARRETT IN THE FRUIT, VEGETABLE, AND GENERAL GARDEN WORK PORTIONS.

DIVISION I.—A TO CAR.

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PREFACE.

THE ILLUSTRATED DICTIONARY OF GARDENING aims at being the best and most complete Work on Gardening and Garden Plants hitherto published. The aim is, indeed, a high one; but the Publisher, whose taste for Flowers has rendered the production a labour of love, has, on his part, spared no expense that the Typography and Illustrations should be of a very high class. It is to be hoped that earnest efforts to attain accuracy, by consulting the best Authorities, combined with no small amount of original research, have contributed to render the *matter* of the Work not unworthy of the *form* in which it is presented to the reader. The large number of Illustrations is an important feature; and it is believed that the figures quoted, and the

references given to various works—in which more detailed information is contained than is desirable, or, indeed, possible, in these pages, on account of space—will greatly add to the interest and value of the work. Considerable trouble has been taken in revising the tangled synonymy of many genera, and clearing up, as much as possible, the confusion that exists in garden literature in connection with so many plants, popular and otherwise. In the matter of generic names, Bentham and Hooker's recently-completed "Genera Plantarum" has, with few exceptions, been followed; that work being the one which will, for a long time to come, undoubtedly remain the standard authority on all that relates to generic limitation. With regard to the nomenclature of species, I have endeavoured to consult the latest and most trustworthy Monographs and Floras, and to adopt the names in accordance with them. Now and then, certain plants are described under their common garden names; but they will, in such cases, be also found mentioned under the genus to which they really belong. A case in point may be cited: *Anœctochilus Lowii* is given under *Anœctochilus*, but the name it must now bear is *Dossinia*, and a reference to that genus will explain matters pretty fully, as far as the present state of knowledge goes.

I am greatly indebted to Professor J. W. H. TRAIL, M.D., F.L.S., &c., for his valuable contributions on Insects, Fungi, and Diseases of Plants, branches of science in which he has long been specially interested, and in which he is an undoubted authority.

Mr. J. GARRETT, of the Royal Gardens, Kew, late of the Royal Horticultural Society's Gardens, is responsible for Fruit and Vegetable Culture, for most

of what appertains to Florists' Flowers, and for General Gardening Work. For information on many special subjects—Begonias may be cited as an example—I am obliged for much assistance to Mr. W. WATSON, also of the Royal Gardens, Kew; in fact, the article *Begonia*, in its entirety, was written by him. Mr. W. B. HEMSLEY, A.L.S., has, throughout, given me aid and advice; and I have to acknowledge constant help from several other colleagues.

The Rev. PERCY W. MYLES, M.A., has taken no little trouble in working out the correct derivations of very many of the Generic Names; unfortunately, in a number of instances, lack of time prevented me from obtaining the benefit of his knowledge. I have to record my gratitude for help in so difficult a task, this special study being one to which Mr. MYLES has paid much attention.
GEORGE NICHOLSON.

ROYAL GARDENS, KEW.

REFERENCE TO ILLUSTRATIONS OF PLANTS OTHER THAN THOSE FIGURED IN THIS WORK.

It has been suggested, by an eminent Authority, that many readers would

be glad to be informed where reliable Illustrations could be found of those Plants which are not figured in this Work. To meet this want, references to the figures in Standard Authorities have been given, the titles of the Works referred to being, for economy of space, abbreviated as follows:

A. B. R. Andrews (H. C.). Botanist's Repository. London,
1799-1811. 10 vols. 4to.

A. E. Andrews (H. C.). Coloured Engravings of Heaths.
London, 1802-30. 4 vols. 4to.

A. F. B. Loudon (J. C.). Arboretum et fruticetum britannicum....
London, 1838. 8 vols. 8vo.

A. F. P. Allioni (C.). Flora pedemontana. Aug. Taur., 1785.
3 vols. Fol.

A. G. Aublet (J. B. C. F.). Histoire des plantes de la
Guiane Française. Londres, 1775. 4 vols. 4to.

A. H. Andrews (H. C.). The Heathery. London, 1804-12.
4 vols. 4to.

B. Maund (B.). The Botanist.... London, 1839.
8 vols. 4to.

B. F. F. Brandis (D.). Forest Flora of ... India. London,
1876, 8vo. Atlas, 4to.

B. F. S.	Beddome (R. H.). Flora sylvatica. Madras [1869-73]. 2 vols. 4to.
B. H.	La Belgique Horticole.... Ghent, 1850, &c.*
B. M.	Botanical Magazine. London, 1787, &c. 8vo.*
B. M. Pl.	Bentley (R.) and Trimen (H.). Medicinal Plants. London, 1875-80. 8vo.
B. O.	Bateman (James). A Monograph of Odontoglossum. London, 1874. Fol.
B. R.	Botanical Register. London, 1815-47. 33 vols. 8vo.
B. Z.	Botanische Zeitung. Berlin, vols. i.-xiii. (1843-55). 8vo. Leipzig, vol. xiv. (1856).*
C. H. P.	Cathcart's Illustrations of Himalayan Plants. London, 1855. Fol.
Enc. T. & S.	Loudon (J. C.). Encyclopædia of Trees and Shrubs.... London, 1842. 8vo.
E. T. S. M.	*See* T. S. M.
F. A. O.	Fitzgerald (R. D.). Australian Orchids. Sydney, 1876. Fol.*
F. D.	Flora Danica—usually quoted as the title of the work, Icones plantarum ... Daniæ et Norvegiæ.... Havniæ. 1761 to 1883. Fol.

F. d. S.	La Flore des Serres et des Jardins de l'Europe. 1845-82. 23 vols. 8vo.
Fl. Ment.	Moggridge (J. T.). Contributions to the Flora of Mentone.... London, 1864-8.
Flora	Flora oder allgemeine botanische Zeitung. 1818-42. 25 vols. 8vo. [New Series] 1843, &c.*
F. M.	Floral Magazine. London, 1861-71, 8vo. 1872-81, 4to.
F. & P.	Florist and Pomologist. London, 1868-84. 8vo.
G. C.	The Gardeners' Chronicle and Agricultural Gazette. London, 1841-65. Fol.
G. C. n. s.	The Gardeners' Chronicle. New Series, 1866, &c. Fol.*
G. G.	Gray (A.). Genera floræ Americæ.... Boston, 1848-9. 2 vols. 8vo.
G. M.	The Gardeners' Magazine. Conducted by Shirley Hibberd. London.
G. M. B.	The Gardeners' Magazine of Botany.... London, 1850-1. 3 vols. 8vo.
Gn.	The Garden. London, 1871, &c. 4to.*
G. W. F. A.	Goodale (G. L.). Wild Flowers of America. Boston, 1877. 4to.
H. B. F.	Hooker (W. J.). The British Ferns.

H. E. F. Hooker (W. J.). Exotic Flora. Edinburgh, 1823-7.
3 vols. 8vo.

H. F. B. A. Hooker (W. J.). Flora boreali-americana.... London, 1833-40. 2 vols. 4to.

H. F. T. Hooker (J. D.). Flora Tasmaniæ. London, 1860.
2 vols. 4to. This is Part 3 of "The Botany of
the Antarctic Voyage of H.M. Discovery Ships
Erebus and *Terror*, in the years 1839-43."

H. G. F. Hooker (W. J.). Garden Ferns. London, 1862. 8vo.

H. S. F. Hooker (W. J.). Species Filicum.

I. H. L'Illustration horticole. Gand, 1850, &c. 8vo.*

I. H. Pl. *See* C. H. P.

J. B. Journal of Botany.... London, 1863. 8vo.*

J. F. A. Jacquin (N. J.). Floræ austriacæ.... icones....
Viennæ, 1773-8. 5 vols. Fol.

J. H. Journal of Horticulture and Cottage Gardener.
Conducted by Dr. Robert Hogg. London.

J. H. S. Journal of the Horticultural Society. London, 1846.
8vo.*

K. E. E. Kotschy. Die Eiche Europas und des Orients.

L. B. C. Loddiges (C.). Botanical Cabinet. London, 1812-33.
20 vols. 4to.

L. C. B. Lindley (J.). Collectanea botanica.... London, 1821. Fol.

L. E. M. La Marck (J. B. P. A. de M. de). Encyclopédie methodique ... Botanique. Paris, 1783-1817. 13 vols. 4to.

L. J. F. Lemaire (C.). Le Jardin fleuriste. Gand, 1851-4. 4 vols. 8vo.

L. R. Lindley (J.). Rosarum Monographia. London, 1820. 8vo.

L. S. O. Lindley (J.). Sertum Orchidaceum.... London, 1838. Fol.

L. & P. F. G. Lindley (J.) and Paxton (J.). Flower Garden.... London.... 1851-3. 3 vols. 4to.

M. A. S. Salm-Dyck. Monographia generum Aloes et Mesembryanthemi. Bonnæ, 1836-63. 4to.

N. Burbidge (F. W.). The Narcissus: Its History and Culture. With a Scientific Review of the Genus by J. G. Baker, F.L.S. London, 1875. 8vo.

N. S. Nuttall (T.). North American Sylva.... Philadelphia, 1865. 3 vols. 8vo.

P. F. G. *See* L. & P. F. G.

P. M. B. Paxton (J). Magazine of Botany. London, 1834-49. 16 vols. 8vo.

Ref. B.	Saunders (W. W.) Refugium botanicum.... London, 1869-72. 8vo.
R. G.	Regel (E.). Gartenflora. 1852, &c.*
R. H.	Revue Horticole.... Paris, 1852.*
R. S. H.	Hooker (J. D.). The Rhododendrons of Sikkim-Himalaya. London, 1849-51. Fol.
R. X. O.	Reichenbach, *fil.* (H. G.). Xenia orchidacea. Leipzig, 1858. 4to.*
S. B. F. G.	Sweet (R.). British Flower Garden. London, 1823-9. 3 vols. 8vo. Second Series. London, 1831-8. 4 vols. 8vo.
S. C.	Sweet (R.). Cistineæ. London, 1825-30. 8vo.
S. E. B.	Smith (J. E.). Exotic Botany.... London, 1804-5. 2 vols. 8vo.
S. F. A.	Sweet (R.). Flora australasica.... London, 1827-8. 8vo.
S. F. d. J.	Siebold (P. F. de) and Vriese (W. H. de). Flore des Jardins du Royaume des Pays-Bas. Leide, 1858-62. 5 vols. 8vo.
S. F. G.	Sibthorp (J.). Flora græca.... London, 1806-40. 10 vols. Fol.
S. H. Ivy	Hibberd (Shirley). The Ivy: a Monograph. London, 1872. 8vo.

Sw. Ger.	Sweet (Robert). Geraniaceæ, the natural order of Gerania. 1828-1830.
Sy. En. B.	Syme (J. T. B.), *now* Boswell. English Botany.... Ed. 3. London, 1863-85. 12 vols. 8vo.
S. Z. F. J.	Siebold (P. F. von) and Zuccarini (J. G.). Flora Japonica.... Lugd. Bat., 1835-44. Fol.
T. H. S.	Transactions of the Horticultural Society. London, 1805-29. 7 vols. 4to.
T. L. S.	Transactions of the Linnæan Society. London, 1791-1875. 30 vols. 4to.*
T. S. M.	Emerson (G. B.). Trees and Shrubs ... of Massachusetts. Boston, Ed. 2, 1875. 2 vols. 8vo.
W. D. B.	Watson (P. W.). Dendrologia Britannica. London. 1825. 2 vols. 8vo.
W. F. A.	*See* G. W. F. A.
W. O. A.	Warner (R.) and Williams (B. S.). The Orchid Album. London, 1882. 4to.*
W. S. O.	Warner (R.). Select Orchidaceous Plants. London, Series i, 1862-65. Fol. Series ii, 1865-75. Fol.
W. & F.	Woods and Forests. 1883-4. 1 vol. 4to.

* Is still in course of publication.

THE DICTIONARY OF GARDENING,

An Encyclopædia of Horticulture.

The following are the Abbreviations used:—*fl.* flowers; *fr.* fruit; *l.* leaves; *h.* height; *deg.* degrees; *rhiz.* rhizomes; *cau.* caudex; *sti.* stipes.

The Asterisks (*) indicate plants that are especially good or distinct.

A. In compound words from the Greek the initial *a* has usually a privative meaning; as *aphyllus*, without leaves; *acaulis*, without a stem, &c.

AARON'S BEARD. *See* **Hypericum calycinum** and **Saxifraga sarmentosa**.

AARON'S ROD. *See* **Verbascum Thapsus**.

ABELE TREE. White Poplar. *See* **Populus alba**.

ABELIA (named after Dr. Clarke Abel, Physician to Lord Amherst's Embassy to China, in 1817, and author of a "Narrative of a Journey to China" (1818); died 1826). ORD. *Caprifoliaceæ*. Very ornamental shrubs. Corolla tubular, funnel-shaped, five-lobed. Leaves petiolate, dentately crenated. Well suited for the cold greenhouse, either as trellis or pot plants; free-flowering when well grown, and of easy culture.

May be treated in sheltered and warm climates as hardy; and can be grown out of doors during summer in less favoured spots. They thrive in a compost of peat and loam in equal parts, to which a small quantity of silver sand may be added. Increased by cuttings in summer, and by layers in spring, under a frame. Only two species, *floribunda* and *rupestris*, are much grown in England.

A. floribunda (many-flowered).* *fl.* rosy-purple, about 2in. long, in axillary clusters. March. *l.* opposite, oblong. *h.* 3ft. Mexico, 1842. The best and freest flowering evergreen species.

A. rupestris (rock).* *fl.* sweet-scented, small, pink, in pairs at the ends of the branches; sepals of leafy texture, with a reddish tinge. September. *l.* small, oblong. *h.* 5ft. China, 1844. A deciduous, branching, hairy shrub.

A. serrata (serrate-leaved). *fl.* pretty pale red, sweet-scented, very large, in one-flowered terminal peduncles; sepals leafy. March. *h.* 3ft. China, 1844. A fine evergreen species.

A. triflora (three-flowered).* *fl.* pale yellow, tinged with pink, small, arranged in threes at the ends of the branches; sepals long and linear, clothed with long hairs. September. *l.* small, lanceolate. *h.* 5ft. Hindostan, 1847. A small evergreen branching shrub.

ABERRANT. Deviating from the natural or direct way; applied, in natural history, to species or genera that deviate from the usual characters of their allies.

ABIES (from *abeo*, to rise; alluding to the aspiring habit of growth of the tree; or, according to some, from *apios*, a Pear-tree, in allusion to the form of the fruit). Spruce Fir. The synonymy of this genus is much confused, plants belonging to several genera being frequently referred to *Abies* in nurserymen's catalogues and gardening periodicals. ORD. *Coniferæ*. A genus of about twenty-five species, widely distributed over the mountainous regions of the Northern hemisphere. Cones cylindrical, or but slightly tapering, erect; catkins generally solitary; the carpels not thickened at the tip; and the leaves solitary, partially scattered in insertion, and more or less two-ranked in direction. Scales deciduous, falling off as soon as the seed is ripe, leaving the axis on the tree. All the species bear seeds at a comparatively early age; most are hardy. For culture, *see* **Pinus**.

A. amabilis (lovely).* *shoots* rather rigid, furrowed with elongated cushions, covered with numerous small dark hairs. *l.* scattered, crowded, 1½in. to 2in. long; linear obtuse, dark green above, silvery beneath. The cones are described as cylindrical, and about 6in. long. *h.* 180ft. California, 1831. A magnificent conifer, very massive in appearance.

A. baborensis.* *l.* linear, dark green, silvery on the under surface, very numerous, those of the larger branches shortly pointed, and those

of the branchlets more obtuse and pointless, ½in. to 1in. long. *cones* erect, cylindrical, usually in clusters of four or five, 5in. to 8in. long, and about 2in. in diameter; scales reniform, greyish-brown, inclosing a thin, dry, and shrivelled bract. *h.* 40ft. to 60ft. Algiers, 1864. This is a very beautiful medium-sized tree. SYN. *A. Numidica.*

A. balsamea (Balm of Gilead or Balsam Fir).* *l.* silvery beneath, apex emarginate or entire, somewhat recurved and spreading, ¾in. long. *cones* cylindrical, violet-coloured, pointing upwards, 4in. to 5in. long, and ½in. broad; scales ¾in. broad, and the same in length. *h.* 40ft. to 60ft. United States and Canada, &c., 1696. A medium-sized slender tree.

A. bifida (bifid). Identical with *A. firma.*

A. brachyphylla (short-leaved).* *l.* linear, spirally inserted round the branchlets, but pointing laterally in two directions, ¾in. to 1½in. in length; lower ones longest, obtusely pointed or emarginate, bright green above, with two silvery lines beneath. *cones* 3in. to 4in. long, purple. *h.* 120ft. Japan, 1870. A recently introduced magnificent fir, with an erect stem, regularly whorled horizontal branches.

A. bracteata (bracted).* *l.* rigid,

linear, flat, distichous, 2in. to 3in. long, bright glossy green above, and glaucous beneath. *cones* about 4in. long, with the bracts developed into long rigid leaf-like linear spines, 2in. long, and slightly curved inwards. *h.* 25ft. Southern California, 1853. A very handsome tall slender tree, but, owing to its very early growth of new shoots, it is much injured by the spring frosts.

A. Brunoniana (Brown's). Synonymous with *Tsuga Brunoniana*.

A. canadensis (Canadian). A synonym of *Tsuga canadensis*.

A. cephalonica (Cephalonian).* *l.* subulate, flat, dark green above, and silvery beneath, acute. *cones* erect, cylindrical, green when young, afterwards reddish, and brown when ripe, 5in. to 6in. in length, and about 1½in. in diameter; scales broad, thin, and rounded, shorter than the bracts. *h.* 50ft. to 60ft. Mountains of Greece, 1824. A very desirable tree for growing in exposed situations.

A. cilicica (Cilician). *l.* linear, slightly curved or straight, 1in. to 1½in. long, dark green above, and glaucous beneath, crowded, in two ranks. *cones* cylindrical, 6in. to 8in. long; scales broad, thin, entire, coriaceous. *h.* 40ft. to 60ft. Mount Taurus, in Asia Minor. This species seldom produces a good specimen

tree in England, and cannot, therefore, be recommended for general cultivation.

A. concolor (one-coloured).* *l.* linear, flat, obtuse, glaucous green, distichously arranged in double rows, those in the lower rows 2in. to 3in. long, upper ones shorter, channelled above. *cones* cylindrical, obtuse both at base and top, 3in. to 5in. long, 2in. to 2½in. in diameter; scales numerous, imbricated, larger than the bracts. *h.* 80ft. to 150ft. California, &c., 1851. A very beautiful species, with yellow bark on the young branches. SYNS. *A. lasiocarpa* and *A. Parsonii*.

A. Douglasii (Douglas'). A synonym of *Pseudotsuga Douglasii*.

A. dumosa (short-leaved). Synonymous with *Tsuga Brunoniana*.

A. excelsa (tall). A synonym of *Picea excelsa*.

A. firma (solid).* *l.* rigid, coriaceous, spirally arranged around the branchlets, but point laterally in two directions, 1in. to 1¼in. long, very variable in young and old trees. *cones* cylindrical, obtuse at both ends, 3in. to 6in. long; scales imbricated, bearing protruding keeled bracts. *h.* 100ft. Japan, 1861. An erect tree, of great beauty.

A. Fortunei (Fortune's). It is said

that in its native country, its aspect is peculiar rather than handsome, and that but one living representative is believed to be in existence in this country—at Veitch's Nursery. SYN. *Keteleeria Fortunei*.

A. Fraseri (Fraser's). Double Balsam Spruce Fir. *l.* linear, emarginate, silvery beneath. *cones* oblong, squarrose, somewhat leafy, obcordate, mucronate, half exserted, reflexed. *h.* 30ft. to 40ft. North Carolina, 1811. This species closely resembles *A. balsamea*, from which it differs in having shorter and more erect leaves, and smaller cones.

A. grandis (splendid).* *l.* in double rows, on each side of the branchlets, flat, obtuse, emarginate, pectinate, silvery beneath, from ¾in. to 1in. long. *cones* lateral, solitary, cylindrical, obtuse at base and apex, 4in. to. 5in. long, 2in. wide; bracts ovate, acuminate, irregularly dentate, very short. *h.* 100ft. California, 1831. A handsome tree of symmetrical habit, and rapid growth.

A. lasiocarpa (woolly-coned). Synonymous with *A. concolor*.

A. magnifica (magnificent).* *l.* densely crowded, two-rowed, 1in. to nearly 2in. long, olive green, very glaucous on the upper surface when young, becoming duller with age,

and marked with two silvery lines beneath. *cones* 6in. to 7in. long, 2½in. to 3in. in diameter; scales, outer edge incurved. *h.* 200ft. North California, 1851. A very tall and stately species, with, at successive intervals, whorls of horizontal branches.

A. Mariesii (Maries'). *l.* erect, evenly disposed around the stem, linear-oblong, obtuse; apex notched, ⅓in. to not quite 1in. long; bracts ovate, oblong, retuse. *cones* erect, cylindrical, 3½in. to 5½in. long, 1½in. to 2in. wide, narrowed at the base and apex, blackish purple; scales entire, nearly 1in. wide, not quite so long as wide. Japan, 1879. A tall, pyramidal tree.

A. Mertensiana (Merten's). Synonymous with *Tsuga Mertensiana*.

A. miniata (vermilion). Synonymous with *Picea eremita*.

A. Morinda (Morinda). Synonymous with *Picea Morinda*.

A. nobilis (noble).* *l.* linear, mostly on one side of the branches, falcate, short, acute, silvery beneath, 1¾in. long. *cones* cylindrical, erect, sessile, 6½in. long, 2¾in. broad, brownish; scales triangular, without the bractea, 1¼in. long, and the same in breadth; bractea spathulate, imbricated backwards, ⅝in. long. *h.*

200ft. to 300ft. California, 1831. A majestic tree.

A. Nordmanniana (Nordmann's).* *l.* linear, rigid, flat, and minutely bifid at the apex, on young trees spreading in two rows, with a half-twist at the base, 1in. long. *cones* erect, slightly ovoid, pedunculate, 4in. to 6in. long, and 2¼in. to 2¾in. wide; bracts large, coriaceous, three-lobed, fringed, greatly exceeding the scales. *h.* 80ft. to 100ft. Crimea, &c., 1848. A magnificent and stately tree, of regular growth.

A. Numidica (Numidian). Synonymous with *A. baborensis*.

A. obovata (reversed-egg-coned). A synonym of *Picea obovata*.

A. orientalis (eastern). Synonymous with *Picea orientalis*.

A. Parsonii (Parson's). Synonymous with *A. concolor*.

A. pectinata (comb-like).* *l.* linear, solitary, flat, obtuse, stiff, turned-up at the points, two-ranked, ½in. to 1in. long, shining green above, with two lines of silvery white on each side of the midrib beneath. *cones* axillary, cylindrical, erect, 6in. to 8in. long, 1½in. to 2in. broad, when ripe, brown; scales with a long dorsal bractea, 1/6in. to 1¼in. long, and 1¼in. broad. *h.* 80ft. to 100ft. A very noble silver fir, of slow growth

when young only. Central Europe, 1603. There are several unimportant varieties of this splendid species.

A. Pindrow (Pindrow). In its native home, the Himalayas, this is a very beautiful tree, attaining the height of 150ft., but it has generally failed in England, in consequence of our late spring frosts destroying the young growth. It comes very near *A. Webbiana*, but is readily distinguished by its longer and more acutely bidented leaves, and smaller cones.

A. Pinsapo (Pinsapo).* The Spanish Silver Fir. *l.* linear, disposed around the branches, nearly terete, and entire at the apex, not quite ½in. long, bright green, with faint silvery lines on the inner side. *cones* sessile, oval, or oblong, 4in. to 5½in. long, about 2in. wide; bracts short, concealed by the broad rounded scales. *h.* 60ft. to 80ft. South Spain, 1839. A very magnificent species, very regular and symmetrical in habit. The one or two varieties offered for sale are not desirable.

A. polita (neat).* *l.* arranged spirally, short, erect, rigid, falcate, acute at the apex, tetragonal, but compressed. *cones* ellipsoid, 3in. to 4in. long; scales light brown, coriaceous, minutely notched at the edge. Island of Nippon, 1861. This is

a beautiful species, admirably adapted as a specimen tree for lawns.

A. religiosa (sacred). *l.* linear, acute, quite entire, 1½in. long. *cones* roundish-oval, 2¾in. long, and 2½in. broad; scales trapezoided-cordate; bracts the length of the scapes, spathulate-oblong. *h.* 100ft. to 150ft. Mexico, 1839. A very handsome species, but not hardy in this country.

A. sachalinensis (Sachalin). *l.* in many rows, 1in. or very slightly more long, $^{1}/_{12}$in. broad, twisted to one side, rigid, linear, obtuse. *cones* sessile, erect, cylindrical, bluntly rounded at the apex, 3in. long, 1in. wide; scales transversely oblong, reniform; margin inflexed, denticulate; bracts ½in. wide, ¼in. long, obovate, serrulate, terminating in a reflexed angular point, exceeding the scale. Japan, 1879. A tall pyramidal robust species.

A. Schrenkiana (Schrenk's). Synonymous with *Picea Schrenkiana*.

A. sibirica (Siberian). Like the last, this species is not recommended; its growth is very slow, even under the most favourable circumstances. Siberia.

A. Smithiana (Smith's). A synonym of *Picea Morinda*.

A. subalpina (sub-alpine).* On the high mountains of Colorado, &c., a tree 60ft. to 100ft. in height. Has not been long enough in English gardens for any decided opinion to be formed as to its merits as an ornamental tree.

A. Tsuga (Tsugan). A synonym of *Tsuga Sieboldi.*

A. Veitchii (Veitch's).* *l.* crowded, lateral ones spreading in a distichous manner, those on the upper side much shorter and pointing forwards, ½in. to 1in. long, linear, flat, glaucous above, silvery beneath; emarginate on the sterile branches, entire on the fertile ones. *cones* erect, sub-cylindrical, purplish-brown, 2in. to 2½in. long, ¾in. to nearly 1in. wide; scales horizontal, reniform, densely packed, each enclosing a short, wedge-shaped bract as long as the scale. *h.* 120ft. to 140ft. Japan, 1860, and again in 1879. Described as a beautiful and interesting tree, as well as perfectly hardy; it should be planted on elevated spots open to the south or south-east.

A. Webbiana (Webb's).* *l.* two-rowed, linear, flat, obtusely emarginate, silvery beneath, 1½in. to 2½in. long. *cones* cylindrical, 6½in. to 7in. long, 2in. or more broad, deep purple; scales kidney-shaped, roundish, closely

compressed, imbricated, about 1in. long, and 1¼in. broad; bracts oblong, apiculate. *h.* 70ft. to 90ft. Himalayan Mountains, 1822. A large handsome pyramidal tree, with numerous branches spreading horizontally, much divided, and densely clothed.

A. Williamsoni (Williamson's). A synonym of *Tsuga Pattoniana*.

ABOBRA (its Brazilian name). ORD. *Cucurbitaceæ*. A genus of stove or greenhouse plants, having solitary axillary diœcious flowers, and finely divided leaves. The only species in cultivation is a very pretty half-hardy climbing perennial, having a fleshy root about 1ft. or more beneath the surface of the soil. It thrives well in warm sunny spots, and in a light soil; seeds may be sown in pots or pans of light soil early in April; the young plants can be planted out about the middle of June. The fleshy tuberous roots may be stored during winter in a greenhouse or frame. *See* also **Gourds**.

A. viridiflora (green-flowered). *fl.* pale green, fragrant; females succeeded by small oval scarlet fruits, which are about as large as a filbert. *l.* dark green, glossy, much divided into narrow segments. South America. A rapid growing plant, admirably adapted for training over arbours or trellis-work. It is a very pretty form of ornamental gourd.

ABORTION. An imperfect formation, or the non-

formation of an organ; any fruit or produce that does not come to maturity, or anything which fails in its progress before it is matured, frequently from a defect in the male or female flowers.

ABRAXAS GROSSULARIATA. *See* **Gooseberry or Magpie Moth**.

ABRICOCK. A former mode of writing Apricot.

ABROMA (from *a*, not, and *broma*, food; from its unwholesomeness). ORD. *Sterculiaceæ*. Handsome, free-flowering evergreen trees, with hairy lobed leaves, and extra axillary or terminal few-flowered peduncles. Of easy culture, in a stove temperature, in loam and peat soil. Propagated by seeds or cuttings, the former sown in March, the latter made in April from half-ripened wood, and placed under a bell glass.

> **A. augusta** (smooth-stalked).* *fl.* dingy purple, drooping. August. *l.* lower, cordate, three to five lobed; upper, ovate-lanceolate, undivided. *h.* 10ft. East India, 1770.
>
> **A. fastuosa** (prickly-stalked). *fl.* dark purple. June. *l.* lower, cordate, acutely five lobed; upper, ovate, entire. *h.* 10ft. New Holland, 1800.

ABRONIA (from *abros*, delicate; referring to its involucrum). Sand Verbena. ORD. *Nyctaginaceæ*. A small genus of seven species, mostly natives of California, four of which only are known in general cultivation. They are of a dwarf trailing habit, producing showy blossoms in dense verbena-like clusters. Corolla funnel-shaped; limb spreading. They succeed best in light sandy soil, in a position fully

exposed; if well drained, the rockery is perhaps the best place. Increased by seeds, the outer skin of which should be peeled off before sowing; sow during autumn in pots of sandy soil, and keep in a frame until the following spring, when they may be placed in their flowering quarters; or by young cuttings, set in spring, and also in sandy soil.



Fig. 1. Abronia Umbellata, showing Flower and Habit.

A. arenaria (sand-loving).* *fl.* lemon-yellow, about ½in. long, in dense clusters, with a honey-like fragrance. July. *l.* broadly ovate, or reniform, on short, thick petioles. *h.* 9in. to 18in. 1865. Half-hardy perennial. Syn. *A. latifolia.*

A. fragrans (fragrant).* *fl.* pure

white, in terminal and axillary clusters, very delicately perfumed, expanding in the evening. May. 1865. A perennial, more or less erect in growth, forming large branching tufts from 1ft. to 2ft. high. Imported seeds only of this species will grow.

A. latifolia (broad-leaved). A synonym of *A. arenaria*.

A. pulchella (pretty). *fl.* pink. July. *h.* 6in. 1848.

A. rosea (rose-coloured). *fl.* rose-coloured. June. *h.* 6in. 1847. An unimportant species.

A. umbellata (umbel-flowered).* *fl.* rosy pink, in dense terminal clusters, slightly scented. April. *l.* oval or oblong. *h.* 6in. to 24in. 1823. An elegant prostrate half-hardy annual; but under greenhouse culture it is a perennial. SYN. *Tricratus admirabilis*. See Fig 1.

ABRUPT. Suddenly terminating, as abruptly pinnate; when pinnate leaves are without a terminal or odd leaflet.

ABRUS (from *abros*, soft, in reference to the extreme softness of the leaves). ORD. *Leguminosæ*. A very ornamental and delicate much branched deciduous stove climber, whose roots have the virtues of the common liquorice. Leaves abruptly pinnate, bearing many pairs of leaflets. Requires a strong heat to keep it in a growing, healthy condition, and to flower it well; and thrives best in sandy loam. Increased by

cuttings under a hand glass, in sand, or seeds raised in heat.

> **A. precatorius** (prayer). *fl.* pale purple, butterfly-shaped, disposed in axillary clusters. Seeds bright scarlet, with a black spot at the base, used by the Buddhists for making rosaries, whence the specific name. March to May. *l.* leaflets ligulate, oblong. *h.* 12ft. East Indies, 1680. Varieties are now and then met with having rose coloured or white flowers.

ABSORPTION. The action by which liquids and gases become incorporated with various bodies, through molecular or other invisible means, to which function all parts of a growing plant contribute, the roots more especially.

ABUTA (native name). ORD. *Menispermaceæ*. A strong growing ornamental stove evergreen climber. Used medicinally in Cayenne. Flowers diœcious, fascicled, males racemosely panicled; females loose and simply racemose. It grows freely in a mixture of loam and peat. Cuttings will root readily if planted in a pot of sand, with a hand glass placed over them, in heat. About half-a-dozen species are known.

> **A. rufescens** (rusty-coloured). *fl.* grey-velvety on the outside, dark purple on the inside. March. *l.* ovate; under surface brownish. *h.* 10ft. Cayenne, 1820.

ABUTILON (Arabic name for a plant analogous to

the Marsh Mallow). ORD. *Malvaceæ*. Very showy, decorative, and free-growing shrubs, both for the greenhouse and outside culture. Calyx naked, five-cleft, usually angular; style multifid at apex. The many beautiful hybrids (of which Fig. 2 represents a group) now in cultivation, far supersede the true species. Cultivation: Few plants are more easily grown and worthy of liberal treatment than these. The best soil for them is equal parts turfy loam, peat, and leaf mould, with some gritty sand. They may either be grown in pots, or planted out; but in all cases thorough drainage is indispensable, as they require an abundance of water, and stagnancy must be guarded against. At the end of May they may be planted outside, when they will flower profusely through the summer. In a free growing and flowering state they enjoy weak manure water. From the latter part of autumn till early spring they may be kept almost dry without injury, though in a warm conservatory some of the later struck plants will go on flowering throughout the greater part of the winter; or plants may be specially prepared for winter flowering. They are admirably adapted for forming standards of various heights, from 2ft. to 6ft. Some of the taller sorts are very useful for training under roof rafters. As pillar plants, too, very loosely trained, so as to allow the upper and side branches to droop to a considerable distance from the pillar, they are very effective. Propagation: They strike readily from cuttings made of the young wood, at almost any season; the best time, however, is early spring and September. Inserted in pots, in a compost of equal parts peat, leaf mould, loam, and sand, and placed in a temperature of from 65deg. to 70deg., they will then quickly root, and form good plants. Seeds may be sown in pans filled with soil as

recommended for cuttings, and placed in a similar temperature. Those followed by a dagger (†) are the best for training to pillars, roofs, &c.

A. Bedfordianum (Bedford's). *fl.* yellow and red. November. *l.* deeply-lobed. *h.* 15ft. Brazil, 1838.

A. Darwini (Darwin's).†* *fl.* bright orange, with darker veinings, fine cupped form. April. *l.* large, broad. *h.* 4ft. Brazil, 1871. A handsome species, of good habit, equally suitable as a stove or greenhouse plant during winter, and for outdoor culture during summer months. There are a great number of garden hybrids from this.

A. globiflorum (globe-flowered). *fl.* solitary, large, globose, cream-coloured. November. *l.* on long stalks, cordate, serrate. *h.* 4ft. to 5ft. Mauritius, 1825.

A. igneum (bright). Synonymous with *A. insigne*.

A. insigne (handsome-flowered).* *fl.* large, purplish crimson, with dark venation, in axillary pendulous racemes; petals short, broad, much reflexed. Winter. *l.* large, cordate, thick, rugose. Stem deep green, with short brown hairs. *h.* 6ft. New Grenada, 1851. SYN. *A. igneum*. See Fig. 3.

A. megapotamicum (big river).†* *fl.*

small, bell-shaped, singularly beautiful, the sepals being dark red, petals pale yellow, and stamens dark brown. Autumn and winter. *l.* small, pointed. *h.* 3ft. Rio Grande, 1864. A free-flowering species, with a graceful drooping habit; the shoots should be well pressed in during spring. SYN. *A. vexillarium*.

A. pæoniflorum (pæony-flowered). *fl.* pink, smaller than those of *A. insigne*, but very distinct. January. *l.* large, ovate. *h.* 6ft. Brazil, 1845.

A. pulchellum (pretty).†* *fl.* white, on few-flowered axillary racemes. July. *l.* cordate, unequally crenated, downy beneath. *h.* 8ft. Habit very branching. New Holland, 1824.

A. striatum (striped).* *fl.* orange yellow, with a thick veining of blood-red, on long curving stalks. *l.* large, lobed, on long slender petioles. Brazil, 1837. A free grower, and makes an excellent greenhouse plant. In sheltered positions, in the south-west of England, this species proves to be almost hardy. It requires to be freely pinched. A very continuous bloomer.

A. Thompsoni (Thompson's). *fl.* striated yellow, large. Summer. *l.* small, vine-like, richly mottled with yellow and dark green. *h.* 3ft. or 4ft. Habit very neat and erect.

A. venosum (veined).†* *fl.* orange, with red veins, very large, bell shaped, 3in. long; pedicels nearly 12in. long. July. *l.* large, deeply palmate. *h.* 10ft. This splendid species is distinguished by its unusually large flowers.

A. vexillarium (standard). Synonymous with *A. megapotamicum*.

A. vitifolium (vine-leaved).* *fl.* porcelain blue, large, cupped. May. *l.* cordate, five to seven lobed, assuming, towards the autumn, a fine golden hue. *h.* 30ft. Chili, 1837. This fine shrub, or tree, is hardy in Ireland and the south of England, but should have a protection from frost. It is not a fast grower.

The following are some of the best varieties, which, although they do not include all the newest sorts, yet afford a good selection of first-rate kinds, which will give general satisfaction. They are arranged according to their respective colours. Those marked with a dagger (†) are best for roofs and pillars.

Orange-flowered. AUREUM GLOBOSUM,* flowers deep orange, heavily red shaded, of medium size, with good form and substance; DARWINI MAJUS,* bright orange, deeply veined, extremely free, and of good form and size; FLEUR D'OR,† light orange, veined pale red, very free and dwarf; GRANDIFLORUM,* deep orange, red shaded, deeply veined

with red, a robust, large-flowered variety; LEO, flowers pale below, deeper above, red-veined, of medium size; PRINCE OF ORANGE,†* a strong grower, and very free.

Ornamental-foliaged. DARWINI TESSELATUM,†* foliage mottled with yellow, invaluable for sub-tropical bedding; SELLOWIANUM MARMORATUM,* very large maple-like foliage, heavily mottled with bright yellow, a most effective variety; THOMPSONI, leaves very freely blotched with yellow; VEXILLARIUM IGNEUM,†* very free, of good habit, prettily blotched. All these ornamental-foliaged varieties are invaluable for bedding purposes.



Fig. 2. Group of Abutilons.

Purple-coloured. Emperor,* flowers large, rich purple magenta shaded, habit vigorous; Louis Van Houtte, very free, rosy purple; Purpurea,* deep purple shaded lake, very attractive; Souvenir de St. Maurice, flowers medium size, very profuse; Violet Queen,* bright violet purple, very distinct and free.

Red and Crimson-flowered.

BRILLIANT,* flowers of good form and substance, brilliant red inside, rather paler outside, dwarf and free; CRIMSON BANNER,* rich crimson, dwarf, very floriferous; FIRE KING,* bright red, orange shaded, veined with crimson; LUSTROUS,* brilliant red crimson, large, most profusely produced, habit dwarf; NE PLUS ULTRA,* intense crimson, of excellent form; SCARLET GEM,* flowers medium sized, brilliant scarlet, habit dwarf and free.

Rose-coloured. ADMIRATION, light pink, shaded salmon, of good form and shape; ANNA CROZY,* deep pink, lilac shade, veined white, very showy; CLOCHETTE,* deep rosy pink, with crimson veins, very dwarf and free; DELICATUM, pale salmon rose, with deeper vein, flowers very large; KING OF THE ROSES,* rich deep rose, of good size and substance, habit dwarf and very free; LADY OF THE LAKE,* flowers medium sized, rich pink; LOUIS MARIGNAC, pale pink, veined white, splendid habit, a charming variety; PRINCESS MARIE,†* flowers rich rosy lake, very profuse, of excellent form; ROSÆFLORUM,†* pale salmon rose, veined with crimson.

White-flowered. BOULE DE NIEGE,†* very fine pure white flowers, the best in its class; PURITY,* very free, of good habit, and pure white; SERAPH,*

dwarf, and very floriferous.



Fig. 3. Flower of Abutilon insigne.

Yellow-flowered. Canary Bird,†* similar in habit to Boule de Niege, bright primrose, very lovely; Couronne d'Or,* bright yellow, of the finest form and substance, very bold foliage; Golden Gem, rich canary yellow, extremely free, of dwarf habit; Lemoinei,† very fine, pale yellow, good size; Queen of the Yellows,* very large, lemon yellow, good substance; Yellow Prince,* rich

golden yellow, of medium size, very profuse.

ABYSSINIAN PRIMROSE. A common name for **Primula Boveana** (which *see*).

ACACIA (from *ac*, a point, in Celtic; or from *akazo*, to sharpen; many of the species are furnished with spines). *See* also *Albizzia*. ORD. *Leguminosæ*. Shrubs or trees, very variable in habit and leaves. Flowers yellow, white, rarely red, disposed in globular heads or spikes, decandrous or polyandrous. Spines stipular, scattered, or wanting. This is a very polymorphous genus, and the majority of species described are known in this country only from herbarium specimens. It is very doubtful whether the entire genus is represented in our gardens by more than about fifty species, many of which are only to be found in botanic gardens; but this number is, without doubt, sufficiently characteristic. The number of species is close upon 400, and the genus one of the largest known. In our enumeration, we have strictly confined ourselves to describing such as are unquestionably in cultivation, and to this end we have adopted the only accurate method of deciding which are and which are not grown, viz., by consulting the trade lists of nurserymen, both in this country and on the Continent. Such lists, however, are not always correct, from a scientific point of view, in the matter of nomenclature. The species best deserving of cultivation are all natives of Australia, New South Wales, or other temperate regions, and are among the hardiest and most easily cultivated of all greenhouse plants. They are very floriferous. The greenhouse species are sufficiently hardy to withstand the winter in a temperature very little higher than freezing point. Cultivation: Some have a

tendency to make long straight shoots; these should be selected for training upon rafters or pillars, on which they thrive well and form splendid ornaments in spring; whilst the more shrubby kinds will be equally at home in pots in the form of bushes. Roots and tops grow with great rapidity, and an abundance of water is required at all times. Immediately after flowering (usually about May) is the best time to prune Acacias; they may then be placed in the open air, and fully exposed to the sun, until October. They make a far healthier, cleaner growth, and ripen their wood much better outside than under glass; all they require is copious waterings, never allowing them to become dry, and keeping clear of weeds. In the first week in October house the plants, and winter in a temperature of 40deg. to 50deg. They delight in a light rich compost of equal parts turfy loam and leaf mould, freely intermixed with sand, or peat may be used instead of the leaf mould. Propagation: Cuttings of the half-ripened wood, put in with a heel, root readily during the summer. They do not bear heat well, nor do they require it. The soil should be equal parts peat and sand, covered with pure sand, thoroughly consolidated. Insert the cuttings as soon as made; water home, and leave them in the shade till dry. Then place the bell glasses over them, shade and water so as to prevent flagging. Pot off as soon as rooted, and keep in a close pit or house until the plants are thoroughly established. Seeds should be sown as soon as ripe, in sandy peat; about ¼in. deep, or a little more, for large seeds. A temperature of 55deg. to 60deg. suits them well. Pot off when large enough to handle, and place in a cool close pit or house until quite established. The culture and propagation of the stove species are the same as for the greenhouse sorts, but the former require, of

course, greater heat. Their flowers, however, are much less frequently produced than their more temperate congeners, consequently they are not so much grown.

A. affinis.* *fl.* yellow. May. *h.* 5ft. New Holland, 1822. Greenhouse species.

A. albicans (whitish).* *fl.* white; heads, two to five, aggregate, rising in racemes from the axils to the leaves. *l.* with eight to nine pairs of pinnæ, each pinna bearing nineteen to twenty-two pairs of oblong linear-leaflets. *h.* 5ft. Swan River.

A. amœna (pleasing). This closely resembles *A. heterophylla*.

A. angustifolia (narrow-leaved). *fl.* yellow, in heads two to four together, pedunculate. April. *l.* with fifteen to twenty pairs of pinnæ, each pinna bearing thirty to forty pairs of linear-acute, ciliated leaflets. *h.* 4ft. New South Wales, 1816. One of the numerous varieties of *A. longifolia*.

A. arabica (Arabian).* Gum Arabic. *fl.* white; heads pedunculate, axillary, usually in threes. *l.* with four to six pairs of pinnæ, each pinna bearing ten to twenty pairs of oblong-linear leaflets. *h.* 20ft. Arabia, East Indies, &c., 1820. Greenhouse species. See Fig. 4.

A. argyrophylla (silver-leaved). A synonym of *A. brachybotrya*.

A. armata (armed, simple leaved).* *fl.* yellow, in solitary globular heads. April. *l.* phyllodia obliquely ovate-oblong, quite entire, one-nerved. *h.* 6ft. to 10ft. Australia, 1803.

A. Benthami (Bentham's). A synonym of *A. cochlearis*.

A. brachybotrya (short-bunched).* *fl.* yellow, in axillary stalked globular heads. April. *l.* phyllodia silvery silky, obliquely obovate, or oblong. *h.* 8ft. Swan River. SYN. *A. argyrophylla*.

A. Catechu (catechu). *fl.* yellow; spikes cylindrical, solitary, twin, or tern, axillary. March. *l.* with ten pairs of pinnæ, each of which bears forty to fifty pairs of linear pubescent leaflets. *h.* 20ft. to 40ft. East Indies, 1790.

A. cavenia (Cavenia).* *fl.* yellow, disposed in globose heads, peduncles, axillary, aggregate. *l.* with usually about five pairs of pinnæ, each of which bears nine to ten pairs of linear-oblong leaflets, clothed with scabrous pubescence. *h.* 20ft. Chili. Greenhouse species.

A. cochlearis (spoon-leaved). *fl.* yellow, in solitary globular heads. April. *l.* phyllodia linear lanceolate, many-nerved at the base, quite

entire, mucronate. *h.* 4ft. West Australia, 1818. SYN. *A. Benthami*.

A. cultriformis (knife-formed).* *fl.* yellow, in crowded heads, disposed in either axillary or terminal racemes. April. *l.* phyllodia eight to ten lines long, four lines broad, cultriform, ending in an acute hooked point, which bears to one side. *h.* 4ft. New South Wales, 1820.

A. cuneata (wedge-shaped).* *fl.* yellow. April. Swan River, 1837. Greenhouse species.

A. cyanophylla (blue-leaved). *fl.* yellow; racemes axillary; heads globose. March. *l.* phyllodia lanceolate, often 1ft. long, glaucous green, almost blue; branches drooping. *h.* 18ft. Swan River, 1838. Arboreous.

A. dealbata (whitened).* The Silver Wattle. *fl.* yellow, in pedicellate heads, disposed in racemes along the axillary branches. July. *l.* from ten to twenty pairs of pinnæ, each of which bears thirty to thirty-five pairs of linear, much crowded pubescent leaflets. *h.* 10ft. to 20ft. Australia and Tasmania, 1820.

A. diffusa (spreading). *fl.* yellow, in globular heads, which are usually twin. May. *l.* phyllodia linear, one-nerved, ending in an oblique acumen; branches diffusely

procumbent, angular. *h.* 2ft. Victoria and Tasmania, 1814.

A. Drummondi (Drummond's).* *fl.* pale lemon; spikes axillary, drooping, cylindrical, simple. April. *l.* with two pairs of pinnæ, each pinna bearing two to three pairs of linear obtuse leaflets. Plant unarmed, silky. *h.* 10ft. Swan River. Very handsome and one of the best grown, forming a somewhat dwarf shrub.



Fig. 4. Acacia arabica (*a*) Flowering Branch, (*b*) Seed-pod.

A. Farnesiana (Farnesian). *fl.* yellow, sweet-scented, disposed in axillary, usually twin, unequally pedunculate heads. July. *l.* with five to eight pairs of pinnæ, each pinna bearing from fifteen to twenty pairs of linear glabrous leaflets. *h.* 6ft. to 10ft. St. Domingo, 1656. Greenhouse species.

A. glauca (milky white).* *fl.* white; spikes globose, stalked, axillary, usually twin. July. *l.* with four to six pairs of pinnæ, each pinna bearing about twelve to fifteen pairs of linear, distant, acute leaflets, which are glaucous beneath. *h.* 5ft. to 10ft. South America, 1690.

A. glaucescens (greyish). *fl.* yellow; spikes twin, but solitary on the peduncles, axillary. June. *l.* phyllodia linear-lanceolate, attenuated at both ends, falcate, three-nerved. *h.* 6ft. to 8ft. Queensland, 1822. SYN. *A. homomalla*.

A. grandis (great).* *fl.* yellow; heads globular; peduncles solitary or twin, axillary, one-headed. February to May. *l.* with one pair of pinnæ, each pinna bearing eight to ten pairs of linear-lanceolate leaflets; branches hairy. *h.* 6ft. West Australia, 1850. A variety of *A. pulchella*.

A. heterophylla (variable-leaved).* *fl.* yellow, in heads, disposed in a

kind of raceme. May. *l.* phyllodia linear, attenuated at both ends, many-nerved. *h.* 5ft. Isle of Bourbon, 1824. *A. amœna* is very like this.

A. hispidissima (hairiest). A variety of *A. pulchella*.

A. holosericea (all silky). *fl.* yellow, in axillary spikes, usually twin. May. *l.* 6in. long, oblong-lanceolate, ending in a soft point at the apex, three-nerved. *h.* 10ft. to 20ft. Australia, 1818. The whole aspect of this tree is silky. SYN. *A. leucophylla*.

A. homomalla (equal-woolled). A synonym of *A. glaucescens*.

A. Hugelii (Baron Hugel's). *fl.* pale yellow. February. West Australia, 1846. Greenhouse species.

A. ixiophylla (Ixia-leaved). *fl.* yellow; heads about twenty-flowered; peduncles downy, shortly racemose or solitary. March. *l.* narrow, oblong-lanceolate, sub-falcate, obtuse, obliquely mucronate, much branched. *h.* 2ft. New South Wales, 1844.

A. juniperina (juniper-leaved). *fl.* yellow, in solitary heads. May. *l.* linear-subulate, ending in a pungent point; branches terete, pubescent. *h.* 6ft. Australia and Tasmania, 1790. Greenhouse.

A. Lebbek (Lebbek).* *fl.* yellow,

sweet-scented; heads many-flowered, pedunculate, three or four together, from the crowded upper nodes. May. *l.* with two to four pairs of pinnæ, each pinna bearing about six to eight pairs of oval, somewhat dimidiate leaflets, which are obtuse at both ends. *h.* 20ft. East and West Indies, 1823. Stove species.

A. leprosa (leprous). *fl.* yellow, mostly five-parted, numerous in a globular head; peduncles mostly in pairs or clusters, ¼in. long. May. *l.* narrow, linear-lanceolate, acute or obtuse with a small callous point, narrowed at base, 1½in. to 3in. long, those of the barren shoots broader. Branchlets pendulous, more or less glutinous. Australia, 1817. (B. R. 1441.)

A. leucophylla (white-leaved). A synonym of *A. holosericea*.

A. lineata (lined). *fl.* yellow, mostly five-parted, ten to fifteen or rarely more in a small, globular head; peduncles slender, rarely exceeding the leaves. April. *l.* linear, with a small hooked point, about ½in., rarely ¾in., long, one-nerved. Branches nearly terete, usually pubescent or villous. *h.* 6ft. Australia, 1824. (B. M. 3346.)

A. l. longissima (longest). Synonymous with *A. longissima*.

A. longifolia (long-leaved).* *fl.* yellow; spikes loose, axillary, cylindrical. March. *l.* phyllodia linear-lanceolate, narrowed at each end, three-nerved, striated. *h.* 10ft. Australia, 1792. A fine erect-growing greenhouse species.

A. longissima (longest-leaved). *fl.* yellow; spikes several, axillary, generally branched. May. *l.* phyllodia very long, filiform, one-nerved, spreading. *h.* 4ft. New South Wales, 1819. Stove species. SYN. *A. linearis longissima.*

A. lunata (half-moon).* *fl.* yellow; heads disposed in racemes, which are longer than the phyllodia. April. *l.* phyllodia obliquely oblong, rather falcate, narrowed at the base, terminating in an oblique callous mucrone. *h.* 2ft. to 4ft. Australia, 1810. Greenhouse species. SYN. *A. oleæfolia.*

A. melanoxylon (black wooded). *fl.* yellow; heads few, disposed in a kind of raceme. April. *l.* phyllodia lanceolate-oblong, rather falcate, obtuse, quite entire, many-nerved. *h.* 6ft. to 10ft. Australia, 1818. Greenhouse species.

A. mollissima (softest-leaved).* *fl.* yellow; heads pedicellate, disposed in racemes along the axillary peduncles. July. *l.* with eight to eighteen pairs of pinnæ, each pinna

bearing thirty to forty pairs of linear, much crowded, pubescent leaflets, which are clothed with yellowish velvety down when young; branches and petioles angular. *h.* 10ft. to 20ft. Van Diemens Land, 1810.

A. oleæfolia (olive-leaved). A synonym of *A. lunata*.

A. oxycedrus (sharp-cedrus).* *fl.* yellow; spikes axillary, solitary, elongated. April. *l.* phyllodia scattered, or somewhat verticillate, lanceolate-linear, ending in a pungent point, three-nerved. *h.* 6ft. to 10ft. New South Wales, 1823. Greenhouse species.

A. paradoxa (paradoxical). *fl.* yellow, disposed in solitary heads. March. *l.* phyllodia obliquely oblong-lanceolate, entire, wavy, one-nerved; branches clammy, glabrous. *h.* 6ft. New Holland. Greenhouse species.

A. penninervis (feather-nerved). *fl.* yellow; heads about the size of a pea, racemose. April. *l.* phyllodia oblong, acuminated at both ends, straight, 2in. to 3in. long, ½in. broad, feather veined. *h.* 4ft. to 6ft. New Holland, 1824.

A. platyptera (broad-winged).* *fl.* yellow; heads solitary, on short peduncles. March. *l.* phyllodia short, bifarious, decurrent, obliquely truncate, mucronate; branches

broadly winged. *h.* 3ft., Swan River, 1840. Greenhouse species.

A. pubescens (downy).* *fl.* yellow; heads small, globose pedicellate, disposed in racemes along the axillary peduncles. March. *l.* with three to ten pairs of pinnæ, each pinna bearing six to eighteen pairs of linear glabrous leaflets. *h.* 6ft. to 10ft. Branches terete, hairy. New Holland, 1790.

A. pulchella (pretty).* *fl.* yellow; heads solitary. April. *l.*, pinnæ bearing five to seven pairs of oblong-ovate, obtuse leaflets. *h.* 2ft. to 3ft. New Holland, 1803. Greenhouse species. The variety *hispidissima* has white flowers.

A. Riceana (Rice's).* *fl.* pale yellow, in long, solitary, axillary spikes. May. *l.* linear, in clusters, dark green, scattered or whorled. *h.* 20ft. Tasmania. Habit graceful, like a weeping willow. Very handsome and distinct. SYN. *A. setigera*. See Fig. 5.

A. rotundifolia (round-leaved). *fl.* yellow; heads globose, solitary, on long peduncles. March. *l.* phyllodia on short petioles, obliquely rounded, obtuse or retuse, mucronate. Branches angular, puberulous. *h.* 6ft. New Holland, 1842.

A. saligna (willow-like). *fl.* yellow; heads solitary, on short peduncles.

March. *l.* phyllodia linear, attenuated at both ends, quite entire, almost nerveless. *h.* 6ft. to 10ft. New Holland, 1818. Greenhouse species.

A. Senegal (Senegal). Gum Senegal. *fl.* white, small, glabrous, distant; spikes axillary, solitary, slender. *l.* with five to eight pairs of pinnæ, each pinna bearing fifteen to eighteen pairs of oblong-linear, obtuse, glabrous leaflets; branches white; prickles sometimes wanting. *h.* 20ft. Arabia, 1823. Stove species.

A. setigera (bristly). Synonymous with *A. Riceana*.

A. sophoræ (sophora-podded). *fl.* yellow; spikes usually twin, axillary. May. *l.* phyllodia obovate, oblong or lanceolate, quite entire, many nerved; sometimes there are bipinnate leaves at the tops of the branches. *h.* 20ft. New Holland, 1805.

A. sphærocephala (round-headed).* *fl.* yellow; racemes axillary, usually twin, ovate-roundish. *l.* with numerous close-set linear falcate pinnules, which are usually tipped by a glandular yellow "food body;" spines twin, hollow. Mexico. A very remarkable stove species, inhabited by ants during certain seasons in its native country.

A. uncinifolia (hook-leaved). *fl.*

yellow; spikes usually twin, dense, on short peduncles, cylindrical. March. *l.* phyllodia long, linear-subulate, flat, recurved, mucronate, three-nerved; branches angular. *h.* 6ft. Swan River, 1846.

A. vera (true). Egyptian Thorn; Gum Arabic. *fl.* white, usually in twin heads, pedunculate, axillary. July. *l.* with two pairs of pinnæ, each pinna bearing eight to ten pairs of oblong linear leaflets; branches and spines red. *h.* 20ft. Egypt, 1596.

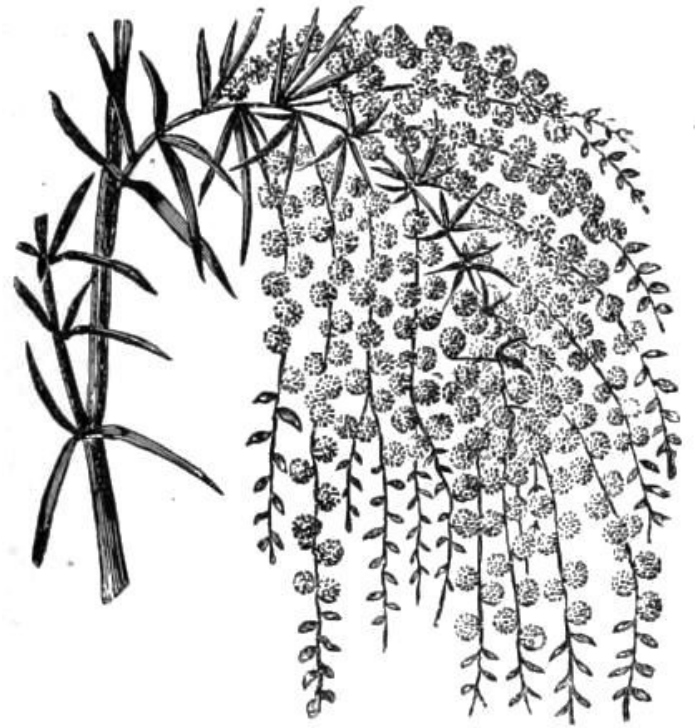


Fig. 5. A Flowering Branch of Acacia Riceana.

A. verticillata (whorl-leaved).* *fl.* yellow; spikes axillary, solitary, oblong. March. *l.* phyllodia linear, ending in a pungent mucrone, disposed somewhat verticillately. *h.* 6ft. to 10ft. A spreading, prickly, greenhouse species, of variable habit. New Holland, 1780.

A. vestita (clothed).* *fl.* yellow, in loosely racemose heads, along the peduncles; upper ones solitary. June. *l.* phyllodia obliquely elliptic-lanceolate, one-nerved, ending in an awnlike mucrone, hispid. *h.* 4ft. New Holland, 1820.

A. viscidula (clammy).* *fl.* yellow; heads globular, on short stalks, axillary, solitary or twin. February. *l.* linear, clammy; branches slender, clammy. *h.* 6ft., erect. New South Wales, 1844.

ACÆNA (from *akaina*, a thorn; in allusion to the slender spines on the calyx or fruit). ORD. *Rosaceæ*. A genus of dwarf sub-shrubby plants. Flowers capitate, or interruptedly spicate, uninteresting; petals absent. Leaves alternate, impari-pinnate. Excepting for rockwork, or as edgings to flower beds, they are not of much value; their habit is, however, very compact and neat. They require similar treatment to other hardy herbaceous plants, in ordinary soil. Increased by cuttings, creeping rootlets, divisions, and by seeds.

A. microphylla (small-leaved).* *fl.* green, small, in close heads,

furnished with showy, long crimson spines. Summer. *l.* small, pinnate. *h.* 1in. to 2in. New Zealand. A neat evergreen with a compact and cushion-like growth; it is a very effective subject for the rock garden, and grows freely in most situations. The crimson globular heads of spine-formed calyces form a conspicuous and ornamental feature of the plant. SYN. *A. Novæ Zealandiæ*. See Fig. 6.

A. millefolia (myriad-leaved).* *fl.* inconspicuous. A very distinct species with finely-cut pale green leaves. The fruiting spikes of this are not collected in globular heads, as in the others, and their presence detract from its value as an ornamental plant. Otherwise, it is very graceful.



FIG. 6. ACÆNA MICROPHYLLA.

A. myriophylla (many-leaved).* *fl.* green, small, in rounded spikes. June. *l.* pinnate; leaflets deeply cut. *h.* 6in. to 1ft. Chili, 1828. Small, fern-like.

A. Novæ Zealandiæ (New Zealand). A synonym of *A. microphylla*.

A. ovalifolia (oval-leaved). *fl.* green. Summer. *h.* 9in. Chili, 1868. Good

for rock gardens.

A. pulchella (pretty).* *fl.* inconspicuous. A pretty bronzy-leaved species, admirably suited for rockwork crevices, where space is no object. It grows very rapidly, and forms handsome tufts.

ACALYPHA (the name given by Hippocrates to the Nettle). ORD. *Euphorbiaceæ*. Stove ornamental and variegated nettle-like leaved shrubs. Flowers greenish or reddish, inconspicuous, in erect or drooping bracted axillary or terminal spikes; those of the upper portion sterile, of the lower, fertile. The undermentioned only are those most worthy of cultivation. They are very easily grown, with ordinary stove treatment, and in a peat and loam compost. When well cultivated, the leaves of the hybridised varieties are highly coloured, but rather coarse than otherwise. Increased by cuttings under a glass in sandy soil, in stove heat, during April.

A. Macafeeana (Macafee's). *l.* red, blotched with bronzy crimson. 1877.

A. macrophylla (large-leaved).* *l.* cordate ovate, russet brown, blotched with paler spots. The best and handsomest stove species.

A. marginata (margined). *l.* large, very hairy, ovate-acuminate, centre brown, with a distinct margin of rosy carmine, about ¼in. wide. Fiji Islands, 1875.

A. musaica (mosaic).* *l.* bronzy green, variegated with orange and

dull red. Polynesia, 1877.

A. torta (twisted). *l.* dark olive, tinted green; margin cut into blunt, oblong segments. Samoan Islands. Remarkable for its curiously contorted foliage. It has erect stems, which are terete, and covered by the leaves in a very singular way.

A. tricolor (three-coloured). A synonym of *A. Wilkesiana*.

A. Wilkesiana (Wilkes').* *l.* ovate-acuminate, curiously blotched, mottled, and splashed with red and crimson; ground colour coppery green. *h.* 6ft. to 10ft. New Hebrides, 1866. SYN. *A. tricolor*.

A. W. marginata (Wilkes's margined).* *l.* large, olive brown, margined with rosy carmine. Fiji Islands, 1875.

ACANTHACEÆ. A large order of soft-wooded, herbaceous plants, usually having gamopetalous axillary flowers; calyx composed of deeply imbricated scales; bracts large, leafy.

ACANTHEPHIPPIUM (the derivation of this word is not apparent). ORD. *Orchideæ*. A peculiar class of terrestrial stove orchids. Flowers rather large, racemose, few; sepals combined in a broad oblique pitcher, including the petals, which are adnate to the base of the column; column short, produced into a long foot. Pseudo-bulbs oblong. Leaves few, large, longer than the scapes. The best species are the two first-mentioned. They will thrive well in sandy peat,

with a quantity of small stones, broken pots, or gravel. A great deal of heat and moisture are absolutely essential during the growing period. Propagated, as soon as growth commences, by dividing the pseudo-bulbs.

A. bicolor (two-coloured).* *fl.* purple and yellow, about 2in. long, campanulate, produced in clusters of three or four together; petals oblong-lanceolate, acutish; lateral lobes of lip rounded. June. *h.* 9in. Ceylon, 1833.

A. Curtisii (Curtis's).* *fl.* same shape as above (except the lip), with numerous purple spots, light rose, and flush; column white, nail of lip yellow, keels yellowish, laciniæ white with purple. Malay Archipelago, 1881. The five keels between the side laciniæ distinguish it from the foregoing species and *A. sylhetense*.

A. javanicum (Javanese).* *fl.* yellow and red, with distinct longitudinal stripes; petals triangular; lip three-lobed; lateral lobes truncate; intermediate lobe constricted in middle, ovate, and tuberculate at the apex, fleshy on both sides at base, with truncate emarginate inflexed teeth. September. *h.* 1½ft. Java, 1843.

A. sylhetense (Sylhet). *fl.* white, with many irregular spots and

blotches towards the extremities of the outer portions. June. *h.* 9in. Sylhet, 1837.

ACANTHOLIMON (from *akanthos*, a spine, and *limon*, sea lavender). ORD. *Plantagineæ*. Dwarf hardy tufted evergreen plants, distinguished from allied genera in having sharp-pointed rigid leaves. They are of rather slow growth, thriving best in a sandy soil, and sunny position, on rockwork more particularly. The flowers are similar to *Statice* and *Armeria*. Increased by seeds (which germinate slowly), sown carefully on a warm but rather shaded border, and transplanted when large enough to handle; or by cuttings and very carefully made divisions. The cuttings should be made in late summer, and placed in a frame, to remain there during the winter.

A. glumaceum (prickly).* *fl.* rose, spicate, about ½in. across, six to eight in a spikelet. Summer. *l.* densely packed and sharply pointed with spines. *h.* 6in. Armenia, 1851. Very compact and distinct. SYN. *Statice Ararati*.

A. Kotschyi (Kotschy's). *fl.* white. A good species, but very rarely seen in British gardens.



FIG. 7. ACANTHOLIMON VENUSTUM.

A. venustum (charming).* *fl.* rose, spicate, from twelve to twenty in each spike. Summer. *l.* broader than in the last, and glaucous. *h.* 6in. or 8in. Cilicia, 1873. A rare and handsome alpine. Larger than the preceding. See Fig. 7.

ACANTHOPHOENIX (from *akantha*, a spine, and *phoinix*, the Date Palm). ORD. *Palmæ*. A very elegant stove palm, differing from *Areca* principally in habit, and requiring a light sandy soil and a summer

temperature of 65deg. to 80deg., winter 55deg. to 65deg. Increased by seeds only; these germinate best in a moist bottom heat, and a well decomposed compost of one part loam, one of peat, one of leaf mould, and the remainder of sand. They may remain in this soil for two or three years.

A. crinita (hairy).* *fl.* spirally arranged, in threes, the central one being female. *l.* the fronds are arched, broadly ovate in outline, pectinately pinnate in division, with long linear acuminate segments, paler beneath. The stem is densely armed with black, needle-shaped spines, and much swollen towards the base. Seychelles, 1868.

ACANTHORHIZA (from *akantha*, a spine, and *rhiza*, a root). ORD. *Palmæ*. A small genus of stove palms, differing from *Trithrinax* by the aërial roots of the trunk hardening into spines (which are horizontal or pointed upwards), and by the blade of the leaf being divided down to the petiole. They delight in a rich loamy soil, and are propagated by seeds, in a moist, sweet hotbed, in spring.

A. aculeata (spiny).* *l.* orbicular, palmately slit into numerous linear-lanceolate, glabrous segments, deep-green above, silvery beneath; petioles slender; the trunk is covered with a network of branching spines. Mexico, 1879. SYN. *Chamærops stauracantha*.

A. Wallisii (Wallis's).* A recent

introduction from tropical America, and not yet much cultivated; it is a tall palm with orbicular palmate leaves.

A. Warzcewiczii (Warzcewicz's).* This differs from the preceding species by its more irregularly divided leaf blade, which is white below. Tropical America.

ACANTHOSTACHYUM (from *akanthos*, a spine, and *stachys*, a spike). ORD. *Bromeliaceæ*. A monotypic genus of stove evergreen herbaceous plants; of easy culture in a compost of equal parts sand, decayed wood, and rotten leaves. Propagated by suckers, which strike readily in bottom heat.

A. strobilacea (cone-fruited). *fl.* red and yellow; scape simple, long, scurfy; bracts coloured. June. *l.* radical, very long, incurved, narrow, thick, pungent, channelled, spiny-toothed, covered with white scurf. *h.* 4ft. Brazil, 1840.

ACANTHUS (from *akanthos*, a spine; several species being spiny or prickly). Bear's Breech. ORD. *Acanthaceæ*. A group of stately, ornamental perennial plants, mostly hardy, remarkable for their vigorous growth and beautiful foliage. Flowers sessile, crowded, spicate; corolla tubular, one-lipped; lip three lobed. To attain perfection they require a deep soil, and a situation fully exposed to the sun. They will, however, thrive moderately well in common soil and partial shade. The habit being generally a bold one, they are most suited for isolated tufts,

backgrounds of mixed borders, and the wild garden. Propagated by seeds, sown in gentle heat, or by division of the roots, in autumn or early spring.

A. carduifolius (thistle-leaved). *fl.* blue. August. *h.* 3ft. Cape of Good Hope, 1816. Greenhouse species.

A. hispanicus (Spanish). *fl.* white. August. *l.* large, shining, and deeply cut. *h.* 2ft. Spain, 1700.

A. longifolius (long-leaved).* *fl.* purple, rose, in the axils of the bracts, which are oval, acuminate, spiny, of a reddish hue, forming a spike nearly 1ft. long. June. *l.* radical, 2ft. to 3ft. long; numerous. *h.* 3ft. to 4½ft. Dalmatia, 1869.

A. lusitanicus (Portugal). Synonymous with *A. mollis latifolius*.

A. mollis (soft).* *fl.* white or rose, sessile in the axils of the deeply-toothed bracts; spikes about 1½ft. Summer. *l.* sinuated, unarmed, heart-shaped in outline, 2ft. long by 1ft. broad. *h.* 3ft. to 4ft. Italy, 1548.

A. m. latifolius (broad-leaved).* A variety of *A. mollis*, but larger and more robust in every part. This very handsome form is probably the best grown; it is one of the most suitable for sub-tropical gardening. A warm sunny spot is needful. SYN. *A. lusitanicus*. See Fig. 8.

A. montanus (mountain).* *fl.* rose.

August. *h.* 3ft. West Africa, 1865. A shrubby species.

A. niger (black). *fl.* purplish white. July to September. *l.* sinuated, unarmed, glabrous, shining green. *h.* 3ft. Portugal, 1759.

A. spinosissimus (most spiny).* *fl.* rosy, sessile, on a very handsome spike, with acute, recurved spines. Autumn. *l.* laciniate, pinnatifid, blistered, spiny; spines white. *h.* 3½ft. South Europe, 1629.



FIG. 8. ACANTHUS MOLLIS LATIFOLIUS.

A. spinosus (spiny).* *fl.* purplish, spicate; sepals spiny. Summer. *l.* deeply and regularly cut, each division terminated by a short spine. *h.* 3ft. to 4ft. South Europe. See Fig. 9.

ACAULESCENT. With apparently no stem.

ACCESSORY. Something additional, not usually

present.

ACCRETE. Fastened with another body, and growing with it.

ACCUMBENT. Lying against anything, in distinction to *incumbent*, or lying upon.

ACER, (from *acer*, hard or sharp; wood is extremely hard, and was formerly much used for making pikes and lances). Maple. ORD. *Sapindaceæ*. A genus comprised, for the most part, of handsome hardy deciduous shrubs, or trees, adapted for forming shrubberies, plantations, &c. Flowers greenish, except where mentioned. *A. Pseudo-platanus* is one of our most useful forest trees. Several of the species produce very useful timber; sugar is one of the constituent parts of the sap of all of them, and is obtained in large quantities from *A. saccharinum*, in North America. They all prefer a somewhat sheltered position. The most satisfactory soil is one free, deep, loamy, and well drained; the latter is especially desirable with some of the Japanese varieties. The varieties of *A. japonicum*, and *palmatum* are well worth growing in pots for conservatory decoration. Propagation: By seeds, sown either in autumn or spring, covering them not more than a ¼in. deep; the common varieties may be sown outside, while the rarer ones should be sown in a frame. By layers, and by grafting; the latter method is adopted with many of the rarer species and varieties, especially the variegated kinds; they are also readily increased by budding in summer.

A. austriacum (Austrian). Synonymous with *A. campestre austriacum*.

A. campestre (field).* Common

Maple. *fl.* on erect racemes. May. *fr.* wings of fruit much divaricated. *l.* small, cordate, with five-toothed lobes. *h.* 20ft. Britain. A small tree with rough bark, full of deep fissures; wood often beautifully veined, when it is highly valued.

A. c. austriacum (Austrian).* *fl.* much larger than those of the species. *fr.* smooth. Lobes of leaves somewhat acuminated. SYN. *A. austriacum.*

A. c. collinum (hill-loving).* *fl.* smaller. *fr.* smooth. Lobes of leaves obtuse. France.

A. c. hebecarpum (downy-fruited).* *fr.* clothed with velvety pubescence.



Fig. 9. Leaf and Flower Spike of Acanthus spinosus.

A. c. lævigatum (smooth-leaved). *l.* very smooth and shining.

A. c. nanum (dwarf). Dwarf habit.

A. c. tauricum (Taurian).* *l.* larger and less divided than in the species.

A. c. variegatum (variegated).* *l.*

beautifully variegated with blotches and stripes of white or whitish yellow; very distinct.

A. circinatum (circinate).* *fl.* deep red, umbellate. April. *l.* seven to nine-lobed, serrulated. *h.* 5ft. to 6ft. North West America, 1827. A very beautiful species, having pendulous branches clothed with leaves, which change into a bright scarlet colour in the autumn.

A. creticum (Cretan). *fl.* on few-flowered erect corymbs. May. *fr.* smooth, with the wings hardly diverging. *l.* cuneated at the base, acutely three-lobed at the top. *h.* 4ft. Levant, 1752. Nearly evergreen.

A. dasycarpum (thick-fruited).* *fl.* conglomerate, on short pedicels, apetalous. April. *l.* truncate at the base, palmately five-lobed, with blunt recesses, and unequally and deeply-toothed lobes. *h.* 40ft. North America, 1725. SYNS. *A. eriocarpon*, *A. tomentosum*, *A. glaucum*, and *A. virginianum*.

A. Douglasii (Douglas). Synonymous with *A. glabrum*.

A. eriocarpon (hairy-fruited). Synonymous with *A. dasycarpum*.

A. Ginnala (Ginnalian).* *fl.* on compound, crowded, erect racemes. Amur River. This is generally classed as a variety of *A. tartaricum*, but its

habit is much more graceful, and in this form the leaves are prettily cut and lobed, whilst the leafstalks and midrib are more deeply coloured.

A. glabrum (smooth).* *fl.* corymbose, on short two-leaved branchlets, greenish-yellow. June. *l.* roundish-cordate, deeply three to five-lobed, or partite; the lobes biserrate, of a light green. *h.* 15ft. to 30ft. North West America. SYNS. *A. Douglasii*, *A. tripartitum*.

A. glaucum (glaucous). Synonymous with *A. dasycarpum*.

A. heterophyllum (various-leaved).* *fl.* corymbose. May. *l.* small, ovate, entire, and three-lobed, slightly serrated, smooth. *h.* 4ft. Levant, 1759. An evergreen. SYN. *A. sempervirens*.

A. ibericum (Iberian). *fl.* corymbose. May. *l.* bluntly three-lobed; lobes with one or two teeth, lateral ones marked with the middle nerve to the insertion of the petiole. *h.* 20ft. Iberia, 1826.

A. japonicum (Japanese).* *fl.* deep purplish-red, large. April. *l.* many-lobed, in early spring very light green. *h.* 20ft. Japan, 1863. The varieties of this species, although not well fixed in many cases, rank amongst the most handsome of the deciduous small shrubs grown, but

often change in character as they attain any considerable size. Plants from 1½ft. to 3ft. high are very useful in cool conservatories, and in the highly kept grounds surrounding the house.

A. laurifolium (laurel-leaved). Synonymous with *A. oblongum*.

A. Lobelii (Lobel's). *l.* very slightly heart-shaped, irregularly toothed, five-lobed; lobes more or less abruptly pointed.

A. macrophyllum (large-leaved).* *fl.* on erect, compound, racemes. May. *l.* digitately five-palmate, with roundish recesses; lobes somewhat three-lobed. *h.* 60ft. Northern California, 1812.

A. monspessulanum (Montpelier).* *fl.* on few-flowered corymbs, erect. May. *l.* cordate, three-lobed; lobes almost or quite entire, equal. *h.* 10ft. to 20ft. South Europe, 1739.

A. montanum (mountain). *fl.* on compound, erect racemes. May. *l.* cordate, three or slightly five-lobed, unequally and coarsely serrated. *h.* 18ft. Canada, 1750. SYN. *A. spicatum*.

A. Negundo. *See* **Negundo fraxinifolium**.

A. oblongum (oblong). *fl.* on compound racemes, pale yellow. February. *l.* oblong-lanceolate,

acuminated, quite entire. *h.* 20ft. Nepaul, 1824. SYN. *A. laurifolium*.

A. obtusifolium (obtuse-leaved). *fl.* drooping, corymbose. May. *l.* rounded, bluntly three-lobed, crenately serrulate, about the length of the petioles. *h.* 15ft. Crete.

A. Opalus (Opalus). A synonym of *A. opulifolium*.

A. opulifolium (Guelder-rose-leaved).* *fl.* on nearly sessile corymbs. May. Ovaries and fruit smooth. *l.* cordate, five-lobed; lobes obtuse, bluntly and coarsely toothed. *h.* 8ft. France, 1823. SYN. *A. Opalus*.

A. o. obtusatum (bluntish).* A larger, strong growing, round-headed tree, with dark green leaves, which are covered with a whitish or rusty tomentum on the under surface.

A. palmatum (palmate-leaved).* *fl.* on five to seven-flowered umbels. May. *l.* palmately divided into five to seven lobes beyond the middle; lobes oblong, acuminated, serrated. *h.* 20ft. Japan, 1820.

A. p. atropurpureum (dark purple).* A vigorous handsome plant, with bold dark purple foliage. Japan.

A. p. crispum (crispy or waved).* *l.* green, with red stalked, convoluted

edges. Japan, 1871. Very distinct, and like a miniature Lombardy poplar in habit of growth.

A. p. dissectum (finely-divided).* *fl.* red, on terminal-stalked racemes, five to six-flowered. May. *l.* nine to ten parted; lobes oblong, acuminated, deeply serrated. *h.* 30ft. Japan, 1845.

A. p. ornatum (beautiful).* Very ornamental, having finely cut deep red leaves, with lighter midribs. Japan, 1871. This variety is also known as *dissectum*.

A. p. palmatifidum (palmatifid).* *l.* very finely palmately divided, the lobes cut down quite to the midrib, of a beautiful light green colour. 1875.

A. p. reticulatum (netted).* *l.* palmately seven-lobed; lobes unequal, sharply serrate, emerald green, with dark green veins. Japan, 1875. A very elegant variety, with slender branches.

A. p. roseo-marginatum (rose-margined).* *l.* freely divided, the lobes deeply cut, light green, margined with rose. Japan, 1874. A very distinct and charming variety.

A. p. sanguineum (blood-red).* *l.* deeply five-lobed, the lobes serrated, of a deep reddish-crimson colour, much brighter than the variety

atropurpureum. 1874. This presents a very striking contrast to the last.

A. p. septemlobum (seven-lobed).* *fl.* purplish, on numerous flowered umbels. Spring. *l.* varying much, from palmately five-lobed, with toothed undivided lobes, to deeply seven to nine-lobed, with more or less finely cut divisions. Japan, 1864. There are numerous beautiful forms of this variety.

There are many varieties of this much varying species, but we have only mentioned those best known; many are only known by their native names, and there is some doubt as to their distinctive characteristics. They are all extremely handsome.

A. pennsylvanicum (Pennsylvanian).* *fl.* in long drooping, simple racemes. May. *l.* cordate, three-lobed, acuminated, finely and acutely serrated. *h.* 20ft. Trunk elegantly striped with white lines. North America, 1755. SYN. *A. striatum*.

A. pictum (painted).* *fl.* corymbose, stalked. *l.* five to seven-lobed; lobes triangular or oblong, entire, acuminated. *h.* 15ft. to 20ft. Temperate Asia, 1840. *A. p. connivens* (converging), *A. p. marmoratum* (spotted), *A. p. rubrum* (red), and *A. p. variegatum* (variegated), are varieties differing principally in the colouring of the

leaves. All are very desirable.

A. platanoides (plane-like).* The Norway Maple. *fl.* on nearly erect stalked corymbs. May, June. *l.* cordate, smooth, five-lobed; lobes acuminated, with a few coarse acute teeth. *h.* 50ft. Europe, 1683. A very ornamental hardy tree, growing with great rapidity when young. It prefers a deep, well-drained soil.

A. p. aureo variegatum (golden-variegated).* *l.* variegated with yellow. Europe, 1383. This, to retain the variegation, requires to be propagated by budding or grafting. The same remarks are equally applicable to the other varieties.

A. p. laciniatum (cut-leaved).* *l.* deeply and variously cut, green and yellow.

A. p. Schwedleri (Schwedler's).* *l.* very large, deep bronzy-red. A vigorous grower, and most effective.

A. p. variegatum (variegated).* *l.* variegated with white. There are several other varieties, but of less importance than the foregoing.

A. Pseudo-platanus (Mock-plane tree).* Sycamore. *fl.* on rather compound pendulous racemes. May. *l.* cordate, with five acuminated unequally-toothed lobes. *h.* 30ft. to 60ft. Europe. There are few deciduous trees so well adapted for

standing singly in rough exposed situations. A deep, soft, dry soil is most suitable for it, but it will grow in soils of very opposite qualities.

A. P. albo variegata (white-variegated).* A very beautiful form, in spring especially. *l.* white and green.

A. P. flavo variegata (yellow-variegated). *l.* variegated with yellow.

A. P. longifolia (long-leaved).* *l.* more deeply cut, and the petioles much longer than in the species.

A. P. purpureum (purple).* *l.* purple underneath. The tree, when slightly ruffled by the wind, alternately appearing clothed in purple and pale green. Numerous other varieties of more or less excellence are grown.

A. rubrum (red).* Scarlet Maple. *fl.* scarlet, handsome, conglomerate, corymbose. *l.* cordate at the base, deeply and unequally toothed, palmately five-lobed, with acute recesses. Branches and fruit also scarlet. *h.* 20ft. Canada, 1656. A variety with leaves splashed with yellow is rare. An excellent species, thriving well in damp, swampy situations, and is commonly increased by layers.

A. rufinerve (red-nerved).* "The

leaves vary both in size and outline, from 2½in. to 4in. each way; three to five-lobed, with irregularly toothed margins, glabrous above, but with reddish hairs along the nerves beneath. The young branches are conspicuous on account of the bluish-grey glaucescence with which they are covered."

A. r. albo-limbatum (white-margined).* differs only from the species in having a very distinct white margin—not always constant. Japan, 1869.

A. saccharinum (Sugar Maple).* *fl.* yellow, on drooping corymbs, on short peduncles; pedicels pilose. April. *l.* cordate, smooth, palmately five-lobed; lobes accuminated, sinuately toothed. *h.* 40ft. N. America, 1735.

A. s. nigrum (blackish).* *fl.* on sessile corymbs, nodding. April, May. *l.* cordate, with the recess closed; palmately five-lobed. *h.* 40ft. North America, 1812.

A. Semenovi (Semenov's).* A slender and graceful species, with leaves closely resembling those of *A. Ginnala*, but smaller. Turkestan, 1879.

A. sempervirens (evergreen). Synonymous with *A. heterophyllum*.

A. spicatum (spiked). Synonymous with *A. montanum*.

A. striatum (striated). Synonymous with *A. pennsylvanicum*.

A. tartaricum (Tartarian).* *fl.* white, on crowded, erect, compound racemes. May. *l.* more or less cordate, acuminated, serrated, with obsolete lobes. *h.* 20ft. 1759. This species is one of the first to expand its leaves in spring.

A. tomentosum (tomentose). Synonymous with *A. dasycarpum*.

A. tripartitum (three-parted). Synonymous with *A. glabrum*.

A. Van Volxemii (Van Volxem's). *fl.* not known in England. *l.* palmately three to five-lobed, very large, light green above, silvery and quite glabrous beneath. Caucasus, 1877. Distinct and fine.

A. villosum (hairy). *fl.* fragrant, on lateral racemes. April. Buds, fruit, and young leaves, silky, villous. *l.* cordate, five-lobed, villous beneath as well as the petioles; lobes ovate acute. *h.* 50ft. Himalaya, at high elevations. Not hardy.

A. virginianum (Virginian). Synonymous with *A. dasycarpum*.

ACERACEÆ. An order of very ornamental hardy trees, of which the sycamore and maple are well-

known representatives.

ACERAS (from *a*, without, and *keras*, a horn; the lip having no spur). ORD. *Orchidaceæ*. An interesting genus of terrestrial orchids. Calyx of three ovate, equal, converging sepals; petals two, narrow, oblong; lip spurless, much longer than the calyx, narrow, oblong, with four linear lobes. The most interesting species is the native one. Indigenous to dry, chalky pastures in the south-east of England, and it will only thrive in similar soils when grown in gardens. Propagated by careful divisions of tubers only.



FIG. 10. FLOWER OF ACERAS ANTHROPOPHORA.

A. anthropophora (The Green Man Orchis). *fl.* greenish, on a long spike, lip longer than the ovary; lip and petals often margined with red. June. *l.* lanceolate. *h.* 1ft. See Fig. 10.

ACERATIUM (from *a*, not, and *keras*, a horn; the stamens being destitute of the terminal bristles so conspicuous in its near ally, *Elæocarpus*). ORD. *Tiliaceæ*. An interesting stove evergreen tree, very closely allied to *Tilia*. It thrives well in a mixture of loam and peat, and is increased by ripe cuttings, which root readily if placed in sand, under a hand glass, in heat.

A. oppositifolium (opposite-leaved).* *fl.* white, on terminal three-flowered peduncles. June. *l.* opposite, elliptic-oblong, furnished

with a few mucronated teeth. *h.* 20ft. Amboyna, 1818.

ACEROSE, ACEROSUS. Needle-pointed, fine, and slender, with a sharp point.

ACETARIOUS. An adjective applied to plants used in salads.

ACEUS. A termination expressing a resemblance to the thing whose name it terminates—*foliaceus*, leaf-like, of the texture of a leaf or *folium*.

ACHANIA. *See* **Malvaviscus**.

ACHENE. A hard, dry, one-seeded, superior seed-vessel.

ACHERONTIA ATROPOS. *See* **Sphinx Atropos**.

ACHILLEA (named after Achilles, who is said to have first discovered the medicinal qualities of this plant). Including *Ptarmica*. Milfoil. ORD. *Compositæ*. A large genus (about fifty species), containing numerous hardy, border and alpine plants. Flower-heads small, corymbose; involucral scales oblong, often with a shrivelled appearance; receptacle with membranous scales, resembling chaff; ray florets few, sometimes rather large and showy; pappus none. Leaves ternate, simple or compound. All the species are easily cultivated in ordinary garden soil. *A. Eupatorium* and other large-growing kinds are well suited for borders or groups, whilst the alpine section should be planted on the rockery. A great number of species, although excellent for naturalising in rough shrubberies, are totally unfitted for garden culture. Propagated, during spring, by root divisions, cuttings, and seeds.

A. ægyptiaca (Egyptian).* *fl.-heads*

rich bright yellow, in closely packed terminal corymbs, which are from 2in. to 4in. across. Summer. *l.* pinnate; leaflets obtusely lanceolate, serrate, silvery white, 6in. to 8in. long. *h.* 1½ft. to 2½ft. Levant, 1640. Handsome perennial, thriving best in a warm position.

A. Ageratum (ageratum-leaved).* *fl.-heads* pure white, large, borne singly on stalks about 6in. or 8in. high. Summer. *l.* narrow, arranged in a dense silvery rosette, the margins prettily crimped. Greece. A pretty alpine, of compact habit.

A. asplenifolia (asplenium-leaved).* *fl.-heads* rose-coloured, small, in a compound corymb. June to September. *l.* lower ones stalked, pinnatifid, lobes pinnate; upper ones pinnate. *h.* 18in. North America, 1803.

A. atrata (black-cupped).* *fl.-heads* white. August. *l.* in a rosette, pinnatifid, deep shining green. Austria, 1596. A pretty alpine.

A. aurea (golden-flowered).* *fl.-heads* golden yellow, borne singly on stems 18in. high. Summer and autumn. *l.* larger than in *A. ageratifolia*, with which species it is sometimes confused. Levant, 1739. Habit tufted. Requires a warm position.



Fig. 11. Achillea Clavennæ, showing Habit and detached Flower-heads.

A. Clavennæ (Clavenna's).* *fl.-heads* white, in neat and compact heads. Spring and summer. *l.* bipinnatifid; segments linear, obtuse, slightly denticulated at the apex. *h.* 10in. Austria, 1656. A very neat and pretty species, having dwarf tufted habit and a hoary appearance. See Fig. 11.

A. decolorans (staining). *fl.-heads* whitish yellow. July. *l.* undivided. *h.* 1ft. Native country unknown. 1798.



Fig. 12. Achillea Eupatorium, showing Habit and detached Flower-head.

A. Eupatorium (fern-leaved).* *fl.-heads* brilliant yellow, in dense convex, compound corymbs, which are often 5in. across, lasting two months in full beauty. June to September. *l.* numerous, linear, pinnate, lobed and serrated, hairy, rough. *h.* 4ft. to 5ft. Caucasus, 1803. This noble plant should be grown at the back of the border, and kept neatly staked. Syn. *A. filipendula*. See Fig. 12.

A. filipendula (dropwort-leaved). Synonymous with *A. Eupatorium*.

A. Herba-rota (Herba-rota).* *fl.-heads* white, in lax corymbs, on slender stems. May. *l.* lanceolate,

serrated. *h.* 6in. France, 1640. When touched, this pretty little plant gives off an agreeable aromatic perfume. To attain full beauty it requires sandy loam and a sunny position.

A. macrophylla (large-leaved). *fl.-heads* white. July. *l.* long and broad pinnate; leaflets horizontal. *h.* 3ft. Italy, 1810.

A. Millefolium roseum (rosy).* *fl.-heads* rose-coloured, in small ovoid heads, which are produced continuously for several months. *l.* strap-shaped; segments very narrow. *h.* 1ft. to 3ft. England. It is well worth growing, both as a border plant, and for cutting purposes.

A. mongolica (Mongolian). *fl.-heads* white. July. *l.* undivided. *h.* 1½ft. Siberia, 1818.

A. moschata (musky).* *fl.-heads* white, in lax corymbs. June. *h.* 6in. *l.* bright green, about 2in. long, pinnatifid. Italy, 1775. A pretty tufted alpine.

A. nana (dwarf). *fl.-heads* white. June to August. *l.* pinnate; leaflets horizontal. *h.* 6in. Italy, 1759. A rockery species.

A. odorata (sweet-scented). *fl.-heads* white, fragrant. June to August. *l.* bipinnate. *h.* 6in. Spain, 1729.

A. pectinata (comb-leaved).* *fl.-

heads white. June. *l.* bright green, about 2in. long, pinnatifid. Italy, 1775. A pretty tufted alpine.

A. Ptarmica flore-pleno (double sneezewort).* *fl.-heads* pure white, freely produced in terminal corymbs. All through the summer and autumn. *l.* lanceolate, serrulate. *h.* 1ft. to 2ft. England. This is one of the most useful white border perennials grown, increasing very readily. When out of flower the stems should be cut down to the surface.

A. santolinoides (lavender-cotton-like). *fl.-heads* white. July. *l.* pinnate; leaflets transverse. *h.* 1ft. Spain.

A. serrata (serrated).* *fl.-heads* clear white, large, in small corymbose clusters, forming a somewhat spreading panicle. Summer. *l.* white, with adpressed hairs, sessile, lanceolate, deeply serrated. *h.* 15in. Switzerland, 1686.



Fig. 13. Achillea tomentosa, showing Habit and detached

Portion of Inflorescence.



FIG. 14. ROOT OF THE ACHIMENE, showing Tubercles.

A. tomentosa (downy).* *fl.-heads* bright yellow, in repeatedly compound corymbs. Summer. *l.* woolly, bipinnatifid; segments linear, acute. *h.* 8in. to 12in. Europe. One of the best yellow-flowered species for the rock garden, having a dense habit. See Fig. 13.

A. umbellata (umbel-flowered).* *fl.-heads* white, six to eight in a simple umbel. June. *l.* regularly lobed; lobes obovate, entire; clothed with a dense, silvery pubescence, on which

account the plant is chiefly cultivated. *h.* 4in. to 5in. Greece. A very pretty, dwarf rock plant.

A. vallesiaca (Vallesian). *fl.-heads* white. June to August. *l.* pinnate; leaflets horizontal. *h.* 1ft. Switzerland, 1819.

ACHIMENES (from *cheimaino*, to suffer from cold; alluding to the general tenderness of the species). Including *Scheeria*. ORD. *Gesneraceæ*. A large genus of handsome, stove or warm greenhouse, branched, generally hairy, herbaceous perennials, with scaly, catkin-like stolons underground (see Fig. 14), and sometimes from the axils of the leaves. Corolla funnel-shaped; tube rather oblique, gibbous behind at the base; pedicels one-flowered, axillary, solitary or fasciculated, bracteated. Leaves opposite, or three in a whorl, serrated.



Fig. 15. Bouquet of Various Achimenes.

To be successfully cultivated, they must be started and grown in stove heat till they commence flowering, when they may be removed to the conservatory or greenhouse, there to remain till after flowering. Batches of tubercles should be started in heat from February till the end of April, so as to give a succession of blossom. Shake each variety out of the old compost and insert separately in light, sandy soil; water sparingly at first, but when active they

may receive more frequent supplies. When the shoots are about 2in. high, the tubercles may be transplanted to the pots, pans, or baskets in which it is intended to grow them, using as potting compost fibrous peat and leaf-soil in equal proportions, with about a sixth part of sheep's or rotten cow manure, and sufficient silver sand to make the whole porous and of a whitish appearance. Thorough drainage is indispensable, and a layer of the rougher soil, or sphagnum, should be placed over the potsherds, to prevent the loose soil stopping the drainage. Place the pans as near the glass as possible, and shade from bright sunshine. Give liberal supplies of water, with occasional doses of liquid manure; and, as the shoots lengthen, they may be pinched, to induce sturdy growth and a larger number of flowering branches. Place neat stakes to each stem, and keep well tied, arranging the stakes as symmetrically as possible, so as to ensure an even outline, but do not allow them to be seen. Light syringing with clear water, morning and evening, is beneficial. After the plants have done flowering, they should gradually have less water as the foliage and stems decay; a light airy situation is needed to mature and ripen the tubers. When the tops are quite dead, they may be removed, and the pots stored on the sides in any warm dry corner where the temperature will not fall below 50deg., keeping the plants quite dry until the time of starting again. Achimenes are liable to attacks of thrips, red-spider, and green-fly, especially if the atmosphere is kept dry; these are easily destroyed by fumigation with tobacco. This must only be done when the foliage is quite dry, otherwise the plants will suffer. Achimenes are especially beautiful when well arranged, especially if two or three varieties are mixed together, as white, red, and purple (Fig. 15).

There are several methods of increasing these:—(1) By cuttings; these need not be cut off at a joint, as they will root from any portion of the stem. Insert them thickly in well-drained pots of sandy soil—say a mixture of equal parts of peat and sand—and place in bottom heat. (2) By leaves, which should be severed from the stems, and pricked in pots of similar soil to the cuttings, placing all the petiole below the surface; stand the pots in bottom heat. (3) By scales from the corms, which should be carefully rubbed off and sown, like seeds, in pots or pans of the same compost, barely covered with sand, and placed in bottom heat. (4) By seeds, which are very small, and, consequently, require to be carefully sown. The pans must be thoroughly drained and filled nearly to the rim, levelled, and well watered with a fine rose, after which the seed should be thinly scattered, covered very lightly with sand, and placed in a shady position. Keep nicely moist, and apply water very lightly, or the tiny germs will be disturbed. Place a sheet of glass over the seed-pans. When the seedlings are large enough to handle, they may be pricked off and afterwards treated like rooted cuttings. The best time for all modes of propagating is early spring.

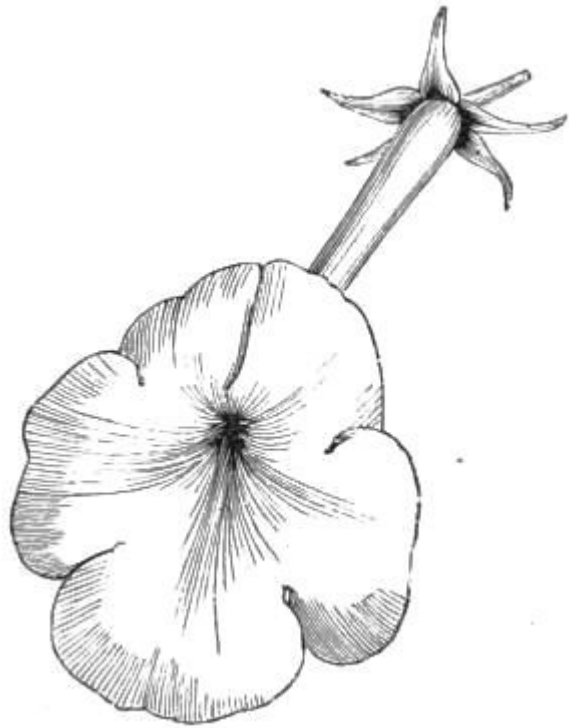


FIG. 16. FLOWER OF ACHIMENES LONGIFLORA.

A. atrosanguinea (dark-crimson).* *fl.* crimson; tube of corolla 1½.in. long, cylindrical, saccate at base, pilose; limb small, spreading; peduncle one-flowered. July, August. *l.* pilose, oblong, sub-cordate, serrated, unequal. *h.* 1½ft. Guatemala, 1848.

A. candida (white).* *fl.* white; tube of corolla gibbous at base; limb oblique, the front segment largest; peduncles axillary, pilose, three-flowered. June. *l.* unequal, oblique

at base, serrated, pilose. *h.* 1½ft. Guatemala, 1848.

A. coccinea (scarlet).* *fl.* scarlet; peduncles solitary, axillary. August. *l.* three in a whorl, ovate, acuminated, serrated, with minute leaves in the axils. *h.* 1½ft. Jamaica, 1778.

A. cupreata (coppery). *fl.* scarlet; calyx spotted inside, with a fringed mouth; petals ciliately toothed; peduncles one-flowered. April. *l.* elliptic, serrated, wrinkled, coloured. *h.* 6in. Mexico, 1845. Plant creeping, downy.

A. gloxiniæflora (gloxinia-flowered).* *fl.* whitish, large, axillary; tube of corolla 2in. long; limb broad, spreading; lobes finely serrated, dotted with purple inside. June. *l.* serrated from middle to top. Stem slender, flexuous. *h.* 1ft. Mexico, 1845.

A. grandiflora (large-flowered).* *fl.* violet purple, very large, solitary, axillary; limbs of corolla spreading. June. *l.* equal, ovate, oblique at base, sparingly serrated. *h.* 1½ft. Mexico, 1842.

A. heterophylla (various-leaved). *fl.* solitary or twin; corolla scarlet; lobes ciliated. July. *l.* opposite, one smaller than the other, cordate ovate, acuminated, coarsely serrated.

h. 1ft. Mexico. Plant rather hairy.

A. hirsuta (hairy). *fl.* reddish, with yellow eye; limb of corolla flat, with rounded serrulate segments; peduncles one-flowered. July. *l.* cordate, serrated. *h.* 2½ft. Stem bulbiferous. Guatemala, 1842. Plant hairy.

A. Kleei (Klee's).* *fl.* lilac; corolla dark near the mouth, with a dash of yellow in the throat; calyx downy; peduncles one-flowered. August. *l.* ovate, acuminate, serrated. *h.* 6in. Guatemala, 1848. Plant hairy.

A. longiflora (long-flowered).* *fl.* violet; segments of calyx lanceolate, erect; corolla with a long tube, and an ample spreading limb; pedicels one-flowered. July and August. *l.* three to four in a whorl, ovate or oblong, coarsely serrated. *h.* 1ft. Guatemala, 1841. Plant hairy. See Fig. 16.

A. multiflora (many-flowered).* *fl.* pale lilac; sepals linear; corolla funnel-shape; tube curved; lobes roundish, lower one fringed; peduncles axillary, three to five-flowered. August. *l.* opposite, or three in a whorl, ovate, deeply and doubly serrated. *h.* 1ft. Brazil, 1843. Plant hairy.

A. ocellata (eye-spotted).* *fl.* reddish yellow, with dark spots,

solitary, drooping; petals nearly equally spotted. Autumn. *l.* on longish petioles, ovate, acuminate, serrated, wrinkled, coloured beneath. *h.* 1½ft. 1845. Plant hairy.

A. patens (spreading). *fl.* violet, blue; calyx downy; tube of corolla shorter than limb, which is spreading. June. *l.* ovate, acuminate, hispid above, serrate. *h.* 1ft. Mexico, 1845.

A. pedunculata (long-stalked).* *fl.* scarlet, with yellow eye; corolla drooping, gibbous at base; peduncles in the axils of the upper leaves. July. *l.* rather unequal, obliquely cordate, ovate, serrated. *h.* 2ft. Stem simple, downy. Guatemala, 1840.

A. picta (painted).* *fl.* scarlet, with yellow eye; tube of calyx turbinate; lobes of corolla roundish, three lower ones smallest; peduncles solitary or two-flowered, axillary one-flowered. July. *l.* opposite, or three in a whorl, cordate-ovate, coarsely serrated, velvety, and elegantly painted. *h.* 1½ft. Mexico, 1843.

A. rosea (rosy). *fl.* rose, pilose; limb of corolla equal to tube; peduncles filiform, many-flowered. June. *l.* sometimes three in a whorl, pilose. *h.* 1½ft. Guatemala, 1848.

The foregoing are the most important species known.

Hybrid varieties are innumerable, and even surpass the species in beauty, the best of which are enumerated below in their respective colours.

Blue and Purple Flowered. ADVANCE,* flowers reddish-purple, lighter at the eye, dwarf, and free habit; ARGUS,* rich plum, with deep orange eye, large and free; DR. BUENZOD,* flowers rich crimson purple, spotted with orange in the centre, very free; EXCELSIOR, rich violet-purple, very large and free, with compact habit; GEM,* flowers small, of good form, rich carmine-purple; GIBSONI,* flowers very large, clear mauve, with the tube white outside; GRANDIS, rich violet purple, with large orange eye, carmine shaded, a charming variety; LADY SCARSDALE,* flowers of fair size, very free, rich plum purple, shaded carmine; LONGIFLORA MAJOR,* a stronger grower than the type, freely producing large rich blue flowers, one of the finest varieties grown; MADAME GEORGE, deep purple shaded crimson; MAUVE QUEEN,* flowers very large, of a distinct mauve, with a brownish eye-shade, very profuse, with a grand habit, one of the best; PURPUREA ELEGANS,* deep claret purple, orange throat with dark spots, a very attractive variety; ROLLISONII,* flowers large, deep lavender-blue, yellow throat, spotted

with deep crimson, very effective; VIVICANS,* dark carmine-purple, with crimson eye, a few blue rays streaking from the eye, habit good, and very free.

Crimson and Scarlet Flowered. AURORA,* rich rosy-scarlet, with yellow throat, very large, fully 2in. across; CARL WOOLFORTH,* deep crimson, shaded lighter at the eye, very free; DAZZLE, flowers small, brilliant scarlet, pale yellow eye, very pretty and free; DIADEM,* crimson lake, shaded carmine, with deep yellow eye; ECLIPSE,* rich orange-scarlet, spotted with carmine, extremely floriferous, with a good habit; FIREFLY,* deep carmine red, golden eye, spotted with crimson, one of the best; HARRY WILLIAMS,* bright cerise red, yellow, maroon spotted, the edge prettily fringed, a very charming variety; LOVELINESS, rich magenta crimson, golden eye, spotted with maroon; METEOR, flowers rather large, bright crimson-scarlet, yellow eye, spotted carmine, very dwarf and free; SCARLET PERFECTION,* rich carmine-scarlet, deep orange eye, very beautiful; SIR TREHERN THOMAS,* deep crimson-lake, very profuse, with a good habit; STELLA, deep magenta, with orange eye, the margins fringed, very large and free, 2in. or more across; WILLIAMSII,* flowers large,

stout, brilliant scarlet, orange throat, habit dwarf and free-branching, one of the finest varieties grown.

Orange-Flowered. GEORGIANA DISCOLOR, flowers large, bright orange, with a distinct yellow centre; HENDERSONI,* rich orange-salmon, with yellow eye; MAGNET,* deep orange, spotted with crimson, with a distinct carmine zone, a very free-flowering and beautiful variety; PARSONSI* is a decided improvement upon the last.

Rose-Flowered. ADMIRATION, deep rose, white throat, spotted with carmine; CARMINIATA SPLENDENS,* bright rose yellow, spotted in the centre, a charming variety; LEOPARD, bright magenta rose, freely spotted at the throat; LONGIFLORA ROSA,* rich lilac rose, deeper in centre, of medium size, very free and dwarf; MASTERPIECE,* deep rose, violet shaded, with a distinct white throat; *Pink Perfection*,* rich rose, the eye rich carmine and violet rayed, one of the best; ROSEA MAGNIFICA,* bright rose, with a yellow eye, very finely spotted, a very lovely variety; ROSE QUEEN,* flowers very large, rich rosy-lake, shaded deep purple, with a well defined orange throat; UNIQUE,* rosy-pink, deep yellow eye, spotted crimson, a very charming variety.

White-Flowered. AMBROSE VERSCHAFFELT,* flowers of good size, pure white, with a dark rayed centre; LONGIFLORA ALBA,* similar in form and habit to Longiflora, but with large white flowers, slightly marked in the centre; MADAME A. VERSCHAFFELT,* flowers large, pure white ground, heavily veined with purple, a very attractive variety; MARGARETTA,* flowers of medium size, pure white, and destitute of any markings whatever.

ACHLAMYDEOUS. Without floral envelope.

ACHRAS. *See* **Sapota**.

ACHYRANTHES. *See* **Chamissoa** and **Iresine**.

ACHYRONIA. Included under **Priestleya** (which *see*).

ACHYROPAPPUS. Included under **Schkuhria** (which *see*).

ACICULAR. Needle-shaped.

ACINETA (from *akineta*, immovable; the lip being jointless). ORD. *Orchideæ*. A small genus of cool house, robust, sub-terrestrial orchids allied to *Peristeria*. Flowers sub-globose, fleshy, arranged on stout, pendulous racemes. Leaves lanceolate, membranous, ribbed. Pseudo-bulbs angular, about as large as hens' eggs. The compost should consist of equal parts of fibrous peat and living sphagnum. In planting, first place a somewhat thick layer of the moss all round the inside of the basket, and press the soil firmly round the plant. During the growing season, the baskets should be taken down twice or

three times a week and dipped into a tub of water, so that the whole may become saturated. In addition, the plants should be sprinkled with the syringe morning and evening, for they delight in an abundant supply of water and plenty of shade. When the growth is finished, they must be kept very dry, an occasional syringing, to keep the leaves from shrivelling, being all that is necessary.

A. Arcei (Arce's). *fl.* yellow. Central America, 1866.

A. Barkeri (Barker's).* *fl.* yellow and dark crimson, on stout scapes, produced from the base of the bulbs, and bearing fifteen to thirty fragrant flowers. Midsummer. *l.* broadly lanceolate, 2ft. long. Pseudo-bulbs 5in. to 7in. long. Mexico, 1837. SYN. *Peristeria Barkeri*.

A. chrysantha (yellow-flowered).* *fl.* yellow, white, and crimson, fragrant; lower part of the lip having a blunt, papillose horn; racemes erect. May. *h.* 2ft. Mexico, 1850.

A. densa (dense-flowered).* *fl.* sub-globose, and of a waxy consistence, lemon-yellow, dotted brown, sweet-scented; racemes rather short. Costa Rica, 1849. A robust-growing species, very like *A. Barkeri*. SYN. *A. Warczewiczii*.

A. Humboldtii (Humboldt's).* *fl.* straw-colour, dotted with brown; scapes 2ft. long. May. *l.* broadly lanceolate, generally four. Columbia,

1872. A handsome species, but the flowers speedily fade. SYNS. *Anguloa superba*, *Peristeria Humboldtii fulva*.

A. sulcata (grooved). *fl.* bright yellow. Columbia, 1879. Very like the last species, from which it differs in mere botanical detail.

A. Warczewiczii (Warczewicz's). A synonym of *A. densa*.

ACINOS. *See* **Calamintha.**

ACIOTIS (from *akis*, a point, and *ous*, an ear; in allusion to the shape of the petals). ORD. *Melastomaceæ*. A small genus of pretty, stove, evergreen plants. Flowers small; panicles slender, loose, terminal; petals four, obliquely awned at the apex. Leaves thin, membranous. For culture, *see* **Melastoma**..

A. aquatica (water-loving). *fl.* white, small, on loose, terminal, filiform panicles. June. *l.* cordate, ovate-oblong. *h.* 6in. to 12in. South America, 1793. The pots in which this species is grown should be kept in pans of water.

A. discolor (various-coloured).* *fl.* small, red, in spicate racemes. *l.* petiolate, elliptic-oblong, purple beneath, deep shining green above. *h.* 1ft. Trinidad, 1816.

ACIPHYLLA (from *ake*, a point, and *phyllon*, a leaf, referring to the sharply pointed segments of the leaf). ORD. *Umbelliferæ*. A genus of curious and remarkable

erect hardy perennials, with densely fascicled, spicate, or panicled umbels of flowers; and pinnate or bi-tripinnate leaves. They are most suited for the rockwork, in a light sandy soil. Propagated by seeds or divisions in spring.

A. Colensoi (Colenso's).* *fl.* white. This extraordinary evergreen forms a circular bush, 5ft. or 6ft. in. diameter, of bayonet-like spines, having flowering stems 6ft. to 9ft. high, covered with spreading spinous leaflets. New Zealand, 1875.

A. squarrosa (rough-headed).* *fl.* white. *h.* 6ft. to 9ft. New Zealand. More frequently met with than the preceding, of very dense growth. Commonly known as the Bayonet Plant.

ACIS (named after Acis, shepherd of Sicily, son of Faunus and the nymph Simæthis). ORD. *Amaryllidaceæ*. A genus of very pretty dwarf bulbous plants, suitable for the rockery, in sunny sheltered situations. This genus was formerly included with *Leucojum*, from which it is distinguished by its dwarf slender habit, filiform style, and membranous capsule. All are delicate little plants, with narrow linear leaves and bell-shaped flowers. They require a free, open, rich soil, and should remain and bloom undisturbed for years; divide the clumps every three or four years, and renew the soil.

A. autumnalis (autumn-blooming).* *fl.*, perianth white, delicate pink at the base, preceding the leaves; two

to three on a stem. Autumn. *l.* few in number, very slender, sheathing the stems at the base. *h.* 4in. to 6in. Portugal, 1629. A charming species, and the only one at all common.

A. grandiflorus (large-flowered).* *fl.*, perianth white, larger than those of the last. August. *h.* 6in. Numidia, 1820. Somewhat rare in cultivation.

A. roseus (rose-coloured).* *fl.*, perianth rose red, not more than ¼in. long; scape one to three-flowered. August. *l.* narrow, blunt, linear. *h.* 3in. Corsica, 1820. Very rare.

A. tingitanum (Tangiers). Of recent introduction; has a many-flowered umbel, and very long leaves.

A. trichophyllus (hair-leaved).* *fl.*, perianth white, about ½in. long; segments loosely nerved, with a faint flush of red at the base. January. *h.* 6 in. Spain, 1820.

ACISANTHERA (from *akis*, a point, and *anthera*, an anther; anthers jointed). ORD. *Melastomaceæ*. A monotypic stove genus allied to Rhexia, of semi-shrubby habit. It grows well in a mixture of loam, sand, and peat; and cuttings root freely in the same soil in stove temperature.

A. quadrata (square-branched). *fl.* purple, ventricose, alternate, axillary, solitary. July. *l.* three-nerved, ovate, crenated; branches

square. Habit erect, branched at the apex. *h.* 1ft. to 1½ft. Jamaica, 1804. More curious than ornamental.

ACMADENIA (from *akme*, a point, and *aden*, a gland; in allusion to the anthers being terminated by pointed glands). ORD. *Rutaceæ*. A small genus of beautiful greenhouse shrubs. Flowers terminal, solitary, or few, furnished with imbricate sepal-like bracts; petals five, with long claws, which are bearded on the inside. Leaves imbricate, linear-oblong, or roundish. They thrive best in a mixture of peat and sand, with a little turfy loam; thorough drainage is also necessary. Young cuttings pricked in a pot of very sandy soil, covered with a bell glass, and shaded, will root freely in a cool house.

A. tetragona (four-angled).* *fl.* white, large, sessile, solitary. June. *l.* roundish-rhomboidal, with scabrous margins. *h.* 1ft. to 2ft. Cape of Good Hope, 1798.

ACMENA (from *Acmenæ*, nymphs of Venus, who had an altar at Olympia). ORD. *Myrtaceæ*. A small genus of greenhouse evergreen shrubs. Flowers in dense trichotomous cymes, with five small distant petals, and very conspicuous and pretty berries. They grow well in an equal mixture of peat, loam, and sand. Propagated readily by placing half-ripened cuttings in sand, under a glass, without heat.

A. floribunda (many-flowered).* *fl.* white, in threes, disposed in a terminal panicled thyrse. May to September. *l.* full of pellucid dots,

oval-lanceolate, acuminated at both ends. Berries globose, bright purple. *h.* 4ft. New Holland, 1790.

A. ovata (ovate-leaved).* A new species, having, according to Mr. W. Bull, ovate leaves, which, along with the stems and petioles, are dark purple, giving the plants, when making new growth, a striking appearance. It has a neat habit.

ACOKANTHERA. *See* **Toxicophlœa**.

ACONIOPTERIS. *See* **Acrostichum**.

ACONITE. *See* **Aconitum**.

ACONITE, WINTER. *See* **Eranthis**.

ACONITUM (from *Aconæ*, or *Acone*, a harbour of Heraclea, in Bithynia, near where it is said to abound). Aconite; Monk's Hood; Wolf's Bane. ORD. *Ranunculaceæ*. An extensive genus of very ornamental hardy perennials. Flowers in terminal racemes; sepals five, the upper one helmet shaped, the two sides broader than the two back ones; petals five, small, the two upper with long claws hooded at the tip; the three inferior smaller or undeveloped. Leaves palmate. They thrive well in any ordinary garden soil. If left undisturbed for several years, they will attain a goodly size, and produce fine panicles of handsome flowers. They are invaluable for growing beneath the shade of trees, where they succeed better than almost any other class of plants. All are very easily propagated by divisions of the roots and seeds; the latter should be sown as soon as ripe in a cold frame. Care should be taken not to leave pieces of the roots about, for, with but one exception, those of

all the species are very poisonous. Although very unlike horse-radish, they have frequently been mistaken for it, with fatal results; and none of the species should be cultivated in or near the kitchen garden.

Sect. I. Roots Tuberous.

A. acuminatum (taper-pointed). *fl.* bluish purple; spur capitate; helmet closed, conical, beaked. July. *l.* with cuneate, bipinnate lobes. *h.* 2ft. to 4ft. Switzerland, 1819.

A. album (white-flowered).* *fl.* pure white, large, with erect helmet, very freely produced. *l.* dark green, with oblong-cuneate divisions. August. *h.* 4ft. to 5ft. Levant, 1752. This is a rare and very handsome species.

A. alpinum (alpine). Synonymous with *A. rostratum.*

A. ampliflorum (large-flowered). *fl.* bluish-purple, large; spur obtuse, straight. June. *l.* with blunt segments. *h.* 2ft. to 3ft. Austria, 1823.

A. angustifolium (narrow-leaved).* *fl.* deep blue, in spiked panicles; spur capitate; helmet closed, hemispherical; lip bifid. June. *l.* palmately cut into linear lobes. *h.* 2ft. to 3ft. Siberia, 1824.

A. biflorum (twin-flowered).* *fl.*

pale blue, usually twin, sessile, the middle rather obscure and with yellowish edges, covered on the back with spreading down; spur truncate; helmet depressed; beak drawn out. June. *l.* lower ones on long stalks, with linear segments. *h.* 6in. Siberia, 1817. A very rare alpine species.

A. Cammarum (Cammarum). *fl.* rich deep purple, on rather loose spikes; spur capitate; helmet closed, hemispherical. July to September. *l.* with short, bluntish lobes. *h.* 3ft. to 4ft. Austria, 1752.

A. cernuum (drooping). *fl.* violet, large, on nodding, loose, hairy racemes; spur capitate, or a little hooked; helmet large, arched, beaked. July and August. *l.* with trapeziform, pinnate lobes. Branches axillary, spreading. *h.* 3ft. to 4ft. Europe, 1800.

A. delphinifolium (Delphinium-leaved).* *fl.* pale bluish purple, large, on loose racemes; spur a little hooked; helmet hemispherical. June. *l.* smooth, deeply cut into five parts. Stems slender. *h.* 6in. to 2ft. North America, 1820. A rare alpine species.

A. elatum (tall). *fl.* blue, very large, in loose panicled spikes; peduncles pubescent; spur capitate, inclining. June. *l.* with linear acute segments. *h.* 3ft. to 4ft. Europe, 1822.

A. eminens (eminent).* *fl.* blue, on erectly spreading pubescent peduncles; spur capitate; helmet closed; lip very long, refracted. June. *l.* with cuneate bipinnate lobes. *h.* 2ft. to 4ft. Europe, 1800.

A. eriostemon (woolly-stamened). *fl.* bluish-purple, disposed in long, beautiful, erect-spreading spikes; spur capitate; helmet closed, arched. June. *l.* with cuneate, bipinnate lobes. *h.* 4ft. Switzerland, 1821.

A. exaltatum (exalted). *fl.* blue, on loose panicles, with ascending stiff branches; spur thick, somewhat hooked; helmet conical; beak elongated. July. *l.* with trapeziform, pinnate lobes. *h.* 6ft. Pyrenees, 1819. SYN. *A. hamatum.*

A. flaccidum (flaccid). *fl.* pale violet, large, on erect spreading peduncles; racemes branched; spur hooked at the apex; helmet high, arched, inclining forwards, gaping. July and August. *l.* multifid, ciliated (as well as the petioles), when young. *h.* 6ft. Siberia, 1822.

A. gibbosum (swollen). Synonymous with *A. nasutum*.

A. Gmelini (Gmelin's). *fl.* cream-coloured, middle-sized, on very long loose racemes; spur straight, obtuse; bottom of the helmet rounded, cylindrical. July. *l.* on long stalks,

villous beneath and shining above; lobes divided into narrow segments. *h.* 2ft. Siberia, 1817. SYN. *A. nitidum*.

A. gracile (slender).* *fl.* pale blue or violet, large, on loose racemes; spur erect, clavated-hooked; helmet with a middle sized beak. June. *l.* smooth, with trapeziform, pinnate lobes. Stems slender. *h.* 2ft. Italy, &c.

A. Halleri (Haller's).* *fl.* opaque violet, on elongated, loose racemes, with a few lateral ascending ones; spur capitate; helmet convex-hemispherical, gaping. June. *l.* lobes linear, dilated, very long. Stem straight, long, branched. *h.* 4ft. to 6ft. Switzerland, 1821.

A. H. bicolor (two-coloured).* *fl.* white, variegated with blue, disposed in spikes or panicles. June.



Fig. 17. Flower of Aconitum Napellus, nearly Full Size.

A. hamatum (hooked). Synonymous with *A. exaltatum*.

A. hebegynum (blunt-styled). Synonymous with *A. paniculatum*.

A. heterophyllum (various-leaved). *fl.* pale yellow, and deep blue in front, large, numerous, dense. August. *l.* petiolate below, sessile above, broadly cordate, coarsely toothed at the edge, and deep green.

h. 2ft. Himalayas, 1874. A new introduction, said to be non-poisonous, and used as a tonic in India.

A. illinitum (anointed). *fl.* pale or deep violet, on very loose and much branched panicles, large; spur thick, long, abruptly pointed; beak blunt; helmet sub-conical. July. *l.* with broad cuneiform lobes, and obtuse lobules. *h.* 4ft. 1821.

A. intermedium (intermediate). *fl.* blue, on a loose panicle, with ascending stiff branches; spur supine, somewhat hooked; helmet arched. June. *l.* with trapeziform, pinnate lobes. *h.* 3ft. to 4ft. Alps of Europe, 1820.

A. japonicum (Japanese).* *fl.* flesh-coloured, on loose panicles, with ascending branches; helmet exactly conical, abruptly mucronate; beak acute, straight. July to September. *l.* stalked, trifid; lateral lobes bifid, middle lobe trifid, all blunt and deeply toothed. Stem round, smooth. *h.* 6ft. Japan, 1790. One of the best species grown.

A. j. cœruleum (blue). *fl.* blue. Japan.

A. laciniosum (jagged). *fl.* pale blue, or with a white base, large, on somewhat contracted racemes; spur clavated-hooked; helmet arched,

conical. June. *l.* with jagged, trapeziform pinnate lobes. *h.* 3ft. Switzerland, 1820.

A. lycoctonum (true Wolf's-bane).* *fl.* livid-violet, rather large; racemes more or less pubescent, branched at the base; bottom of helmet cylindrical; beak elongated. July. *l.* large, seven-parted. Stem slender, simple, upright. *h.* 4ft. to 6ft. Europe, 1596.

A. maximum (largest). *fl.* pale blue; panicle loose, furnished with a few long distant, few-flowered, pubescent branches; spur short, incurved; helmet hemispherico-conical, obtuse. July. *l.* multifid, large, smooth. *h.* 6ft. Kamtschatka, 1823.

A. meloctonum (Badger's-bane). *fl.* cream-coloured, loose, pubescent; panicle large, with diverging branches; spur arched; bottom of helmet conico-cylindrical. July. *l.* five to seven-parted, deep green. *h.* 2ft. to 4ft. Piedmont, 1821.

A. Meyeri (Meyer's). *fl.* bluish purple, on pubescent peduncles; spur capitate, inclining. June. *l.* with cuneate bipinnate lobes. *h.* 2ft. to 4ft. Bavaria, 1823.

A. molle (soft). *fl.* violet, large, puberulous; racemes panicled, pubescent; helmet irregularly

conical, obtuse; front erect; spur capitate, or a little hooked. June. *l.* smooth, with trapeziform, pinnate lobes. *h.* 2ft. to 6ft. 1820.



Fig. 18. Aconitum Napellus, showing Root, Seed-pod, Flower-spike, Leaf, and Flower with Sepals removed.

A. Napellus (little turnip).* Common Monk's Hood. *fl.* blue, large, on a large terminal raceme; peduncles erect, pubescent; spur capitate; helmet convex-hemispherical, gaping, smoothish;

lip revolute. Summer. *l.* pedately five-lobed. *h.* 3ft. to 4ft. There are a great number of varieties of this species cultivated and introduced. The following are some of the names representing slightly varying forms which have, however, been regarded as species by Reichenbach and other authors: *acutum*, *amœnum*, *Bernhardianum*, *Braunii*, *callibotryon*, *Clusianum*, *commutatum*, *firmum*, *formosum*, *Funkianum*, *hians*, *Hoppeanum*, *Kœhleri*, *lætum*, *laxiflorum*, *laxum*, *Mielichhoferi*, *napelloides*, *neomontanum*, *neubergense*, *oligocarpus*, *rigidum*, *strictum*, *tenuifolium*, *venustum*, *virgatum*. One of the most virulent of poisonous plants, both to cattle as well as human beings; and, notwithstanding its eminently handsome appearance, it should only be planted in places where no danger is likely to arise from its presence. See Figs. 17 and 18.

A. nasutum (great-nosed). *fl.* violet; panicle contracted, quite smooth; spur elongated, arched; helmet conical, bending forward; beak short. June. *l.* with broad, trapeziform, pinnate lobes. *h.* 3ft. Caucasus, &c., 1818. SYN. *A. gibbosum*.

A. nitidum (shining). Synonymous with *A. Gmelini*.

A. Ottonianum (Otto's).* *fl.* blue, variegated with white; young peduncles nodding; spur supine, somewhat hooked; helmet arched. July, August. *l.* with trapeziform, pinnate lobes. *h.* 2ft. to 4ft. Carpathian Mountains, 1824.

A. paniculatum (paniculate).* *fl.* large, violet; panicle terminal, much branched, loose or contracted, more or less pubescent; helmet conical, beaked; front sinuate. June to September. *l.* smooth, with trapeziform, pinnate lobes. *h.* 2ft. to 3ft. France and Switzerland, 1815. SYN. *A. hebegynum.*

A. plicatum (folded). Synonymous with *A. tauricum.*

A. productum (long-lipped). *fl.* violet, downy, on few-flowered, loose, pubescent racemes; helmet straight, irregularly convex-conical, with a drawn-out beak; spur capitate. June. *l.* on long stalks with three-parted lobes. *h.* 1ft. Siberia.

A. rostratum (beaked).* *fl.* violet; panicle rather loose; spur thick, depressed, globose; helmet conical, elongated, abruptly pointed in front; beak stretched out. June. *l.* with trapeziform, pinnate lobes. *h.* 1ft. to 2ft. Switzerland, 1752. SYN. *A. alpinum.*

A. Schleicheri (Schleicher's). *fl.* blue

or violet, middle sized, on short racemes; spur capitate; helmet convex-hemispherical, gaping, smoothish. Summer. *l.* with finely jagged lobes. Stem straight (or infracted), simple, slender. *h.* 2ft. to 3ft. Europe. SYN. *A. vulgare*.

A. semigaleatum (half-helmeted). *fl.* pale blue, pubescent when young, on very loose racemes; peduncles elongated; spur hooked; helmet convex, navicular. June. *l.* multifid, few, membranous, smooth; root about the size and form of a pea. *h.* 6in. to 2ft. Kamtschatka, 1818.

A. Sprengelii (Sprengel's). *fl.* bluish purple; spur obtuse, straight. June. *l.* with blunt, bipinnate lobes. *h.* 3ft. to 4ft. Europe, 1820.

A. tauricum (Taurian).* *fl.* deep blue, disposed in dense racemes; peduncles erect, smooth; lateral sepals smooth inside; spur blunt; helmet closed, hemispherical. June. *l.* segments almost pedately disposed and divided into linear acuminate lobes. *h.* 3ft. to 4ft. Germany, 1752. SYN. *A. plicatum*.

A. tortuosum (twisting). *fl.* pale or deep violet, large; panicle loose, few flowered; spur thick, long, abruptly pointed (neither arched, nor convolute). July. *l.* smooth, with narrow wedge-shaped lobes, and acute lobules. *h.* 6ft. to 8ft. North

America, 1812.

A. toxicum (very poisonous). *fl.* violet, large, pubescent, on loose, also pubescent, racemes; spur hooked; helmet large, arched, with a blunt beak. June. *l.* smooth, with trapeziform pinnate lobes. Stem flexuous, almost simple. *h.* 2ft. America, 1825.

A. uncinatum (hooked).* *fl.* generally lilac, large, smooth; racemes loose, rather umbellate at the apex, very rarely panicled; spur somewhat spiral, inclined; helmet regularly conical, compressed. July. *l.* with trapeziform pinnate lobes. Stem with branches rising from the axils of the leaves. *h.* 4ft. to 8ft. North America, 1768.

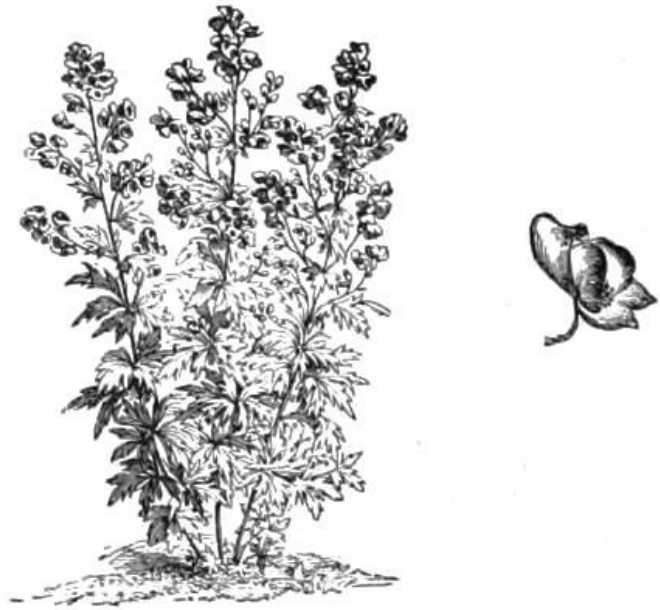


Fig. 19. Aconitum Variegatum, showing Habit and Flower.

A. variegatum (variegated).* *fl.* blue, large, smooth; racemes panicled, loose; spur erect, clavated-hooked; helmet bent forward, inflated; beak ascending. July. *l.* lower, on long stalks; upper, sessile, smooth, thickish. *h.* 1ft. to 6ft. Europe, 1597. See Fig. 19.

A. v. albiflorum (white-flowered).* *fl.* white, small; helmet straight.

A. v. bicolor (two-coloured).* *fl.* white, edged with blue or lilac; helmet straight.

A. vulgare (common). A synonym of *A. Schleicheri*.

A. Willdenovii (Willdenow's).* *fl.* bluish-purple; peduncles pubescent; spur obtuse, straight. June. *l.* with blunt segments. *h.* 2ft. to 3ft. Carniola, 1823.

Sect. II. Roots Fibrous or Napiform.

A. Anthora (Anthora).* *fl.* pale yellow; panicles generally pubescent; spur refracted; lip obcordate; helmet arched. July. *l.* palmately cut into linear lobes. *h.* 1ft. to 2ft. Pyrenees, 1596. The following varieties of *A. Anthora* are erroneously classed as species by some authors:

A. a. Decandollii (Decandolle's). *fl.* yellow; panicle and flowers pubescent; helmet rather conical, bent, with a short, abrupt, and acuminated beak. *l.* with rather large dark green lobes. Alps of Jura, 1873.

A. a. eulophum (well-crested). *fl.* yellow; panicles and flowers puberulous; helmet conical. Caucasus, 1821.

A. a. grandiflorum (large-flowered). *fl.* yellow, large; panicle, flowers, and fruit pubescent; helmet rather conical. Alps of Jura, 1821.

A. a. Jacquinii (Jacquin's). *fl.* yellow, smooth; helmet somewhat conical, drawn out into an elongated

beak.

A. a. nemorosum (grove-loving).* *fl.* yellow; panicle and flowers pubescent; helmet somewhat conical, bent; beak short. *l.* with broad lobes.

A. autumnale (autumn-flowering).* *fl.* bluish-purple, in loose panicles; peduncles rigidly spreading; spur capitate; helmet closed; lip very long, refracted. July. *l.* with cuneate, bipinnate lobes. *h.* 3ft. to 4ft. Europe.

A. barbatum (bearded).* *fl.* cream coloured, middle sized; racemes dense, puberulous; spur straightish, obtuse; bottom of helmet conical; middle sepals densely bearded. July. *l.* opaque, with the lobes divided into many linear segments, on long stalks, which are villous as well as the nerves. *h.* 2ft. to 6ft. Siberia, 1807. SYN. *A. squarrosum*.

A. chinense (Chinese).* *fl.* intense and very bright blue, in large compound racemes; pedicels slightly hairy above. Summer. *l.* lower ones large, deeply cut into three wedge-shaped segments, tapering at the base; upper ones sessile, gradually becoming more entire. *h.* 4ft. to 6ft. China, 1833.

A. Lamarckii (Lamarck's). *fl.* cream-coloured, pubescent; racemes long,

cylindrical, crowded, branched at the base; spur spiral; helmet constricted, clavate. July. *l.* large, seven to nine-parted, with the lobes unequally cleft. *h.* 2ft. to 3ft. Pyrenees, 1800.

A. lupicidum (Wolf's-bane). Synonymous with *A. Vulparia*.

A. macrophyllum (large-leaved). *fl.* yellow, numerous, panicled; spur arched; helmet large, somewhat ventricose at the apex. July. *l.* large, more or less dissected. *h.* 4ft. to 8ft. Germany.

A. Nuttallii (Nuttall's). Synonymous with *A. ochroleucum*.

A. ochroleucum (yellowish-white).* *fl.* cream coloured, large; spur arched; bottom of helmet conico-cylindrical; middle sepals covered with short hairs; racemes puberulous, rather loose. July. *l.* five to seven-parted, deep green, the first ones are puberulous above. *h.* 2ft. to 4ft. Russia, 1794. SYNS. *A. Nuttallii*, *A. pallidum*.

A. Pallasii (Pallas'). Probably a mere variety, with a continuous spur, of *A. anthora*.

A. pallidum (pale). Synonymous with *A. ochroleucum*.

A. pyrenaicum (Pyrenean).* *fl.* yellow, rather large; spur hooked;

bottom of helmet cylindrical, rounded; racemes elongated, dense, puberulous. June. *l.* parted almost to the base, with pinnatifid lobes, rather hispid beneath, but smooth above, on long stalks. *h.* 2ft. Pyrenees, &c., 1739.

A. squarrosum (rough). Synonymous with *A. barbatum*.

A. vulparia (Fox-bane).* *fl.* pale yellow, smooth; spur spiral; helmet cylindrical, large; beak stretched out, acute; racemes crowded. July. *l.* three or five-lobed, ciliated. *h.* 1ft. to 3ft. Europe, 1821. SYN. *A. lupicidum*. The principal varieties of this species are:—

A. v. carpaticum (Carpathian). *fl.* panicled, of a lurid colour, sometimes variegated with yellow; helmet conico-cylindrical, compressed; peduncles smooth. *l.* profoundly cut. Stems smooth. *h.* 2ft. to 3ft. Carpathian Mountains, 1810.

A. v. Cynoctonum (tall Dog's-bane). *fl.* (and stem) yellow, smoothish, numerous, panicled. *h.* 3ft. to 4ft. France, 1820.

A. v. moldavicum (Moldavian). *fl.* violet, panicled; helmet cylindrical, compressed. *h.* 3ft. to 4ft. Moldavia.

A. v. rubicundum (reddish). *fl.* livid violet, panicled, villous, variegated with yellow; helmet conico-

cylindrical, compressed. *h.* 2ft. to 3ft. Siberia, 1819.

A. v. septentrionale (northern).* *fl.* blue, panicled, villous; helmet conico-cylindrical, compressed. *h.* 4ft. North Europe, 1800.

ACONTIAS. *See* **Xanthosoma**.

ACORN. The seed or fruit of the oak. *See* **Quercus**.

ACORUS (from *a*, without, and *kore*, the pupil of the eye; in allusion to its reputed medicinal qualities). ORD. *Aroideæ*. A small genus of hardy herbaceous plants. Flowers on a sessile spadix; perianth six-cleft, inferior, persistent. They thrive best in a moist soil, and are very suitable for the banks of water, or even as aquatics in shallow water. Propagated easily by divisions during spring.

A. Calamus (sweet-flag).* *fl.* yellowish, small, borne on a cylindrical spadix 4in. to 6in. long. Summer. *l.* sword-shaped, erect, striated 3ft. long. The root is cylindrical, channelled, and very fragrant. Europe. The variety with gold-striped leaves is more useful as a decorative plant. See Fig. 20.



FIG. 20. ACORUS CALAMUS.

A. gramineus (grass-leaved). China, 1796. This is much smaller in all its parts than the above, but very pretty.

A. g. variegatus.* A pretty variety with white striped leaves, forming handsome little tufts.

ACOTYLEDONS. Plants having no cotyledons, or seed leaves, as in *Cuscuta*, but usually applied to cryptogamic or flowerless plants, such as ferns, mosses, &c.

ACRADENIA (from *akra*, top, and *aden*, a gland; referring to the five glands on the top of the ovary). ORD. *Rutaceæ*. An excellent neat and compact

evergreen bush, suitable for the cool conservatory. It requires a rich loam and leaf mould. Propagated by seeds and cuttings under a bell glass.

> **A. Frankliniæ** (Lady Franklin's).* *fl.* white, produced in great profusion, in terminal clusters. August. *l.* fragrant, opposite, trifoliate, gland-dotted. *h.* 8ft. Tasmania, 1845.

ACRE (from *agros*, an open field). The English Statute acre consists of 160 square rods (perches, poles, roods, or lugs); or 4840 square yards; or 43,560 square feet. The following list shows the differentiation in the number of square yards per acre in the various districts of Great Britain and Ireland: Cheshire, 10,240; Cornish, 5760; Cunningham, 6250; Derby (W.), 9000; Devonshire, 4000; Herefordshire, 3226⅔; Irish, 7840; Leicestershire, 2308¾; Scotch, 6150; Wales, North (customary), 3240; ditto (erw), 4320; Westmoreland, 6760; Wiltshire, 3630.

ACRIDOCARPUS (from *akris*, a locust; and *karpos*, fruit; meaning not obvious). ORD. *Malpighiaceæ*. A handsome sub-tropical or warm greenhouse climber, requiring plenty of water, and a very free drainage. Increased by imported seeds, and by cuttings in bottom heat.

> **A. natalitius** (Natal).* *fl.* pale yellow; petals five, rounded, wedge-shaped, crenately-toothed at the edge; racemes simple, elongated, terminal. July. *l.* oblong or obovate, obtuse, leathery. Natal, 1867.

ACRIOPSIS (from *akros*, top, and *opsis*, eye). ORD. *Orchidaceæ*. A small genus of pretty stove epiphytal orchids, almost unknown to cultivation. Flowers small, arranged in loose panicles; lip adnate to the very curious column, from which it projects at right angles.

A. densiflora (crowded-flowered).* *fl.* green and pink. May. *l.* linear-lanceolate. *h.* 6in. Borneo, 1845.

A. javanica (Javanese). *fl.* yellow, green. May. *l.* linear-lanceolate. *h.* 3in. Java, 1840.

A. picta (painted).* *fl.* white, green, and purple. May. *l.* solitary, linear. *h.* 6in. Bantam, 1843.

ACROCLINIUM (from *akros*, top, and *kline*, a bed; referring to the open flowers). ORD. *Compositæ*. A small genus of elegant half hardy annuals with "everlasting" flower heads, which are solitary, terminal, and consist of tubular florets; involucrum many-leaved, imbricated. Leaves numerous, linear, smooth, acuminated. Stems numerous, erect. They thrive best in a loamy soil, and constitute very neat summer flowering annuals if sown out of doors in patches in June; they are also useful as winter decorative greenhouse plants if seed is sown in August in pots placed in a cold frame. The flower-heads should be gathered when young, if it is desired to preserve them.

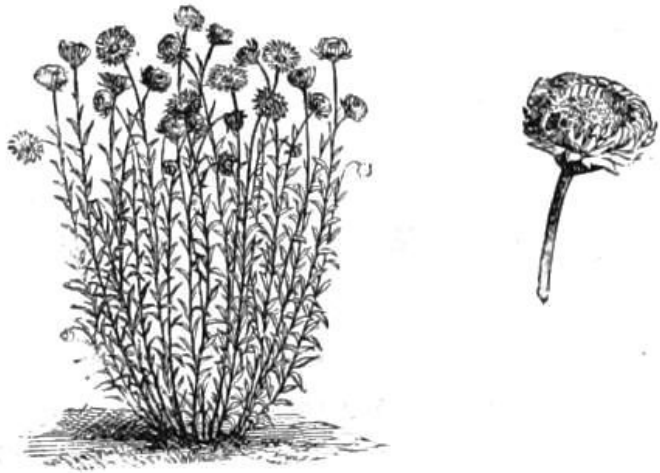


Fig. 21. Acroclinium roseum, showing Habit and Flower-head.

A. roseum (rosy).* *fl.-heads* pretty rose, solitary, terminal, on erect, slender, and gracefully disposed branches. *l.* linear, acute. *h.* 1ft. to 2ft. S. W. Australia, 1854. See Fig. 21.

A. r. album (rosy white).* A very pretty white form of the preceding.

A. r. grandiflorum (large-flowered).* *fl.-heads* rose, larger than in the type.

ACROCOMIA (from *akros*, top, and *kome*, tuft; referring to the position of the leaves). Ord. *Palmeæ*. A genus of South American palms, containing about eleven species, which are not easily distinguished, but having the following general characteristics: Trunk from 20ft. to 50ft. high, and clad with long prickles. The flowers, which appear in the axils of

the lower leaves, are greenish or yellow, and their drupes are much the same colour. Leaves pinnate, with seventy to eighty leaflets on each side of the pinnæ. They require a warm greenhouse and rich sandy loam. Increased by suckers. Two species only are in general cultivation.

A. aculeata (prickly). *h.* 40ft. West Indies, 1791.

A. fusiformis (spindle-shaped). *h.* 40ft. Trinidad, 1731.

A. globosa (globular). **h.** 20ft. St. Vincent, 1824.

A. horrida (horrid). *h.* 30ft. Trinidad, 1820.

A. lasiospatha (hairy spathed). *l.* drooping. Trunk about 40ft. high, smooth and ringed. Para, 1846.

A. sclerocarpa (hard-fruited).* A very elegant species bearing a head of spreading pinnate leaves, with the rachises and petioles aculeate, and the leaflets linear, taper-pointed, glaucous underneath, about 1ft. long. *h.* 40ft. West Indies, 1731. SYN. *Cocos fusiformis*.

A. tenuifolia (fine-leaved). *h.* 30ft. Brazil, 1824.

ACROGENS. Plants increasing at the summit, as Ferns, &c.

ACRONYCHIA (from *akron*, tuft, and *onux*, a claw; referring to the curved points of the petals). ORD. *Rutaceæ*. An ornamental rue-like greenhouse

evergreen shrub. Petals and sepals four; stamens eight, inserted on a disk; fruit berry-like. It requires ordinary greenhouse treatment. Increased by cuttings in July in sand, under a bell glass.

A. Cunninghami (Cunningham's).* *fl.* white, in clusters, resembling those of an orange, with an exquisite fragrance. July. *h.* 7ft. Moreton Bay, 1838.

ACROPERA. *See* **Gongora**.

ACROPHORUS. *See* **Davallia**.

ACROPHYLLUM (from *akros*, top, and *phyllon*, a leaf; referring to the way in which the leaves are produced at the summit of the branches, above the flowers). ORD. *Cunoniaceæ*. Handsome greenhouse small, erect-growing, evergreen shrubs, flowering profusely during the spring months. They require a mixture of fibrous peat, a little loam, and sharp sand; thorough drainage, an airy situation, and as little artificial heat as possible, are important to its well-being. Re-pot in February. Propagated by cuttings of the half ripened shoots, which strike freely in a soil of sand and peat, if covered with a hand glass, and placed in a cool house. The roots should not be allowed to get dry, and light syringing during late spring and summer will be found beneficial in assisting to keep down thrips.

A. verticillatum (whorled). A synonym of *A. venosum*.

A. venosum (veined).* *fl.* pinkish white, in dense axillary spikes, which are borne on the upper part of

the stems and branches. May and June. *l.* nearly sessile, oblong, cordate, acute, serrate, in whorls of threes. *h.* 6ft. New South Wales. SYN. *A. verticillatum*.

ACROPTERIS. *See* **Asplenium.**

ACROSTICHUM (from *akros*, top, and *stichos*, order; meaning very obscure). ORD. *Filices*. This genus includes *Aconiopteris*, *Chrysodium*, *Egenolfia*, *Elaphoglossum*, *Gymnopteris*, *Olfersia*, *Photinopteris*, *Pœcilipteris*, *Polybotrya*, *Rhipidopteris*, *Soromanes*, *Stenochlæna*, *Stenosemia*. A large and almost entirely tropical genus; it includes groups with a wide range in venation and cutting. Sori spread over the whole surface of the frond or upper pinnæ, or occasionally over both surfaces. The species having long fronds, are admirably suited for growing in suspended baskets, and the dwarfer sorts do well in Wardian cases. A compost of peat, chopped sphagnum, and sand, is most suitable. For general culture, *see* **Ferns**.

A. acuminatum (taper-pointed).* *rhiz.* thick, climbing. *sti.* 4in. to 6in. long, firm, erect, scaly throughout. *barren fronds* 1ft. to 2ft. long, 1ft. or more broad, deltoid, bipinnate; upper pinnæ oblong-lanceolate, slightly lobed, truncate on the lower side at the base, 2in. to 3in. long, ¾in. to 1in. broad; lower pinnæ, 6in. to 8in. long, 4in. to 5in. broad, with several small pinnules on each side; light green, with a firm texture. *fertile fronds* 1ft. long, deltoid, tripinnate. Brazil. Stove species. SYN.

Polybotrya acuminatum.

A. alienum (foreign). *rhiz.* woody. *sti.* 6in. to 18in. long, scaly downwards. *barren fronds* 1ft. to 2ft. long, often 1ft. broad, the upper part deeply pinnatifid, with lanceolate lobes, the lower part pinnate, with entire or deeply pinnatifid lower pinnæ. *fertile fronds* much smaller, with distant narrow linear or pinnatifid leafy pinnæ. Tropical America. Stove species. SYN. *Gymnopteris aliena*.

A. apiifolium (parsley-leaved).* *cau.* stout, woody, erect. *sti.* of barren fronds 2in. to 3in. long, erect, densely clothed with tomentum. *barren fronds* 4in. to 6in. each way, deltoid, tripinnate; pinnæ close, only the lowest pair with pinnatifid pinnules, ultimate divisions oblong-rhomboidal, ¼in. to ⅓in. long, the base cuneate, the outer edge slightly toothed. *fertile fronds* on a slender naked stem 6in. to 8in. long, the fronds panicled with a few distant, slender, simple, or compound branches. Philippine Islands, 1862. Stove species. SYN. *Polybotrya apiifolia*.

A. apodum (stemless).* *cau.* thick, woody, the scales dense, linear, brown, crisped. *sti.* tufted, very short, or obsolete. *barren fronds* 1ft. or more long, 1½in. to 2in. broad,

the apex acuminate, the lower part narrowed very gradually, the edge and midrib densely fringed with soft, short, brown hairs. *fertile fronds* much smaller than the barren ones. West Indies to Peru, 1824. Stove species. SYN. *Elaphoglossum apodum.*

A. appendiculatum (appendaged).* *rhiz.* firm, woody. *barren fronds* 6in. to 18in. long, 4in. to 8in. broad, simply pinnate. *sti.* 3in. to 6in. long, erect, naked, or slightly scaly; pinnæ 2in. to 4in. long, ⅜in. to ¾in. broad, the edge varying from sub-entire to cut half-way down to the midrib of the blunt lobes, the upper side often auricled, the lower one obliquely truncate, dark green. *fertile fronds* narrower, on a longer spike, the pinnæ roundish or oblong, often distinctly stalked. India, &c., 1824. Stove species. SYN. *Egenolfia appendiculata*.

A. aureum (golden).* *cau.* erect. *sti.* erect, 1ft. to 2ft. long, strong. *fronds* 2ft. to 6ft. long, 1ft. to 2ft. broad, the upper pinnæ fertile, rather smaller than the barren ones, which are usually stalked, ligulate oblong, 3in. to 1ft. long, ½in. to 3in. broad, acute or blunt, sometimes retuse with a mucro; edge quite entire, base sub-cuneate. Widely distributed in the tropics of both hemispheres, 1815. An evergreen aquatic stove

species, requiring abundance of heat and moisture. SYN. *Chrysodium aureum*.

A. auritum (eared).* *cau.* erect, woody. *barren fronds* with a stipe 6in. to 9in. long, deltoid, 8in. to 12in. each way, ternate, the central segments deeply pinnatifid, with lanceolate entire lobes; the lateral ones unequal sided, with lanceolate oblong-lobed lower pinnules. *fertile fronds* with a stem 12in. to 18in. long, deltoid, with distant linear pinnæ half line broad; upper simple, lower pinnatifid. Philippine Islands. Stove species. SYN. *Stenosemia aurita*.

A. axillare (axillary). *rhiz.* slender, wide scandent. *barren fronds* 6in. to 18in. long, about 1in. broad, simple, the point bluntish, the edge entire, the lower half tapering very gradually to the base or short stem. *fertile fronds* 6in. to 12in. long, one to three lines broad, flexuose, on a stem 1in. to 6in. long. Himalayas. Greenhouse species. SYN. *Chrysodium axillare*.

A. barbatum (bearded). Synonymous with *A. scolopendrifolium*.

A. bifurcatum (twice-forked). *sti.* densely tufted, 2in. to 4in. long, slender, stramineous, naked. *fronds* 3in. to 4in. long, about ½in. broad, pinnate; lower pinnæ of fertile

fronds two or three cleft, with linear divisions; those of the barren pinnæ broader, and not so deep. St. Helena. Greenhouse species. SYN. *Polybotrya bifurcata*.

A. Blumeanum (Blume's).* *rhiz.* woody, wide climbing. *sti.* of barren fronds 6in. long, scaly. *barren fronds* 1ft. to 3ft. long, 1ft. or more broad, with numerous sessile pinnæ on each side, which are 4in. to 6in. long, 1in. broad; apex acuminate, the edge slightly toothed; base rounded. *fertile fronds* with distant pinnæ 4in. to 8in. long, ⅛in. to ¼in. broad. Assam. Greenhouse species. SYN. *Chrysodium Blumeanum*.

A. callæfolium (calla-leaved). A form of *A. latifolium*.

A. canaliculatum (channelled).* *rhiz.* woody, wide climbing, spinulose and scaly. *sti.* 1ft. or more long, scaly throughout. *fertile fronds* 2ft. to 3ft. long, 12in. to 18in. broad, tripinnate; lower barren pinnæ, 6in. to 9in. long, 4in. to 5in. broad; pinnules lanceolate, stalked, with oblong segments, both surfaces naked; fertile pinnules close, the segments ¼in. long, bearing three to four sessile balls of sori. Venezuela. Stove or greenhouse species. SYN. *Polybotrya canaliculata*.

A. caudatum (tailed). A synonym of *A. petiolosum*.

A. cervinum (stag-horned).* *rhiz.* woody, creeping, scaly. *sti.* 1ft. or more long, scaly. *barren fronds* 2ft. to 4ft. long, pinnate; pinnæ 4in. to 9in. long, 1in. to 2in. broad, entire or nearly so, unequal at the base; fertile pinnæ distant, linear, lanceolate, bipinnate, with short spreading subcylindrical pinnules. Brazil, 1840. Stove species. SYN. *Olfersia cervina*.

A. conforme (conformed). *rhiz.* wide creeping, scaly. *sti.* 1in. to 12in. long, firm, erect, stramineous, naked or slightly scaly. *fronds* 2in. to 9in. long, ½in. to 2in. broad, acute or bluntish, the base cuneate or spathulate, the edge entire. *barren fronds* narrower than the fertile one. *A. laurifolium*, *A. obtusilobum*, and several others, are identical with the foregoing. Tropical America, also in the Old World. Stove species. SYN. *Elaphoglossum conforme*.

A. crinitum (hairy).* *cau.* woody, erect. *sti.* of barren fronds 4in. to 8in. long, densely clothed with long scales. *barren fronds* 9in. to 18in. long, 4in. to 9in. wide, broadly oblong; apex blunt, base rounded, edge entire and ciliated, texture subcoriaceous, both sides scattered over with scales like those of the stipes. *fertile fronds* like the others, but much smaller, the stipes longer. West Indies, &c., 1793. Stove

species. SYNS. *Chrysodium* and *Hymenodium crinitum*.

A. cylindricum (cylindrical). Synonymous with *A. osmundaceum*.

A. Dombeyanum (Dombey's). A form of *A. lepidotum*.

A. flagelliferum (rod-shaped). *rhiz.* woody, creeping. *sti.* of barren fronds 6in. to 12in. long, nearly naked. *barren fronds* simple or with one to three pairs of pinnæ, the terminal one ovate lanceolate, entire or repand, often elongated and rooting at the point, the lateral ones 3in. to 6in. long, 1in. to 2in. broad; fertile pinnæ 2in. to 3in. long, about ½in. broad. India, &c., 1828. Stove species. SYN. *Gymnopteris flagellifera*.

A. fœniculaceum (fennel-leaved).* *rhiz.* slender, creeping. *sti.* distant, slender, 2in. to 8in. long, scaly. *barren fronds* 1in. to 2in. broad, usually dichotomously forked, with filiform divisions. *fertile fronds* ⅜in. broad, two-lobed. Andes of Ecuador. Stove species. (For culture, see *A. peltatum*). SYN. *Rhipidopteris fœniculaceum*.

A. Herminieri (Herminier's).* *rhiz.* stout, creeping. *sti.* very short, or none. *barren fronds* 1½ft. to 3ft. long, 1in. to 1½in. broad, simple, acuminate, the lower part narrowed very gradually. *fertile fronds* short-

stalked, 3in. to 4in. long, 1in. to 1½in. broad. Tropical America, 1871. Stove species. SYN. *Elaphoglossum Herminieri*.

A. heteromorphum (various-formed). *rhiz.* slender, wide creeping, scaly. *sti.* 1in. to 3in. long, slender, slightly scaly. *barren fronds* 1½in. to 2in. long, ¾in. to 1in. broad, simple, bluntish, the base rounded, both surfaces scattered over with linear dark castaneous scales. *fertile fronds* much smaller, and the stipes much longer. Columbia and Ecuador. Stove species. SYN. *Elaphoglossum heteromorphum*.

A. Langsdorffii (Langsdorff's). Synonymous with *A. muscosum*.

A. latifolium (broad-leaved).* *rhiz.* thick, woody, creeping, scaly. *sti.* 6in. to 12in. long, firm, erect, naked, or scaly. *barren fronds* 9in. to 18in. long, 2in. to 4in. broad, simple, acute, gradually narrowed below, entire; texture leathery. *fertile fronds* considerably narrower than the barren ones. *A. longifolium*, *A. callæfolium*, &c., are only varieties of this species. Mexico, Brazil, &c. Stove species. SYN. *Elaphoglossum latifolium*.

A. lepidotum (scaly).* *rhiz.* thick, woody, very scaly. *sti.* 1in. to 3in. long, firm, scaly throughout. *barren*

fronds 3in. to 6in. long, about ½in. broad, simple, usually blunt, the base cuneate or rather rounded, both surfaces and midrib very scaly. *A. Dombeyanum*, of garden origin, is a varietal form of this, of which there are several others. Tropical America. Stove species. SYN. *Elaphoglossum lepidotum*.

A. longifolium (long-leaved). A form of *A. latifolium*.

A. Meyerianum (Meyer's). Synonymous with *A. tenuifolium*.

A. muscosum (mossy).* *rhiz.* woody, densely scaly. *sti.* 4in. to 6in. long, firm, clothed with large pale brown scales. *barren fronds* 6in. to 12in. long, 1in. to 1½in. broad, simple, narrowed at both ends; upper surface slightly scaly; lower quite hidden by imbricated brownish scales. *barren fronds* much smaller than the others, the stipes longer. Madeira. Greenhouse species. SYN. *A. Langsdorffii*.

A. Neitnerii. Synonymous with *A. quercifolium*.

A. nicotianæfolium (tobacco-leaved).* *rhiz.* woody, wide creeping, scaly. *sti.* 1½ft. to 2ft., scaly below. *barren fronds* 1ft. to 3ft. long, 1ft. or more broad, with a large terminal pinna, and one to three lateral pairs, which are 6in. to

9in. long, 1in. to 3in. broad, acuminate, entire, or nearly so, the base slightly rounded, fertile pinnæ distant, 3in. to 4in. long, ¾in. broad. Cuba, &c. Stove species. SYN. *Gymnopteris nicotianæfolium*.

A. osmundaceum (osmunda-like).* *rhiz*. woody, wide scandent, scaly. *sti*. 12in. to 18in. long, firm, erect, scaly at the base. *barren fronds* ample, bi- or tripinnate; the lower pinnæ 1ft. to 2ft. long, 4in. to 8in. broad; pinnules stalked, lanceolate, with closely set sub-entire segments, of a light green colour; both surfaces naked. *fertile fronds* nearly or quite as large as the barren ones; segments linear cylindrical, ¼in. to ½in. long. Tropical America. Stove species. SYNS. *A. cylindricum*, and *Polybotrya osmundaceum*.

A. paleaceum (chaffy). Synonymous with *A. squamosum*.



Fig. 22. Acrostichum peltatum.

A. peltatum (peltate-leaved).* *rhiz.* slender, wide creeping. *sti.* distant, slender, 1in. to 4in. long, scaly throughout. *barren fronds* 1in. to 2in. each way, repeatedly dichotomously forked, with narrow linear ultimate divisions, quarter to half line broad. *fertile fronds* ½in. broad, often two-lobed. West Indies. Stove or greenhouse species. This elegant

little fern requires a liberal supply of water all the year round, and is best grown in a well drained pan of good fibrous peat, leaf soil, and sand, with some nodules of sandstone raised above the rim of the pan; do not disturb it more than is necessary. SYN. *Rhipidopteris peltata*. See Fig. 22.

A. petiolosum (petioled). *rhiz.* woody, wide scandent. *sti.* woody, erect, scaly at the base. *fronds* bipinnate, or tripinnatifid, 2ft. to 4ft. long, 1ft. to 3ft. broad, deltoid; the upper barren pinnæ lanceolate, pinnatifid, the longest sometimes 18in. long, and 6in. to 10in. broad; pinnules with long falcate lobes reaching half-way down to the midrib, both surfaces naked; fertile pinnules very narrow, and dangling, continuous or beaded. West Indies, Mexico, &c. Stove species. SYNS. *Polybotrya* and *A. caudatum*.

A. piloselloides (mouse ear-leaved). Synonymous with *A. spathulatum*.

A. platyrhynchos (broad-beaked). *sti.* tufted, scarcely any. *fronds* 12in. to 16in. long, 1in. broad, simple. *sori* in a patch at the apex, 1in. to 2in. long, ⅜in. broad, which does not reach to the entire edge; the lower part narrowed gradually, with naked surfaces, and a coriaceous texture. Philippines. Stove species. SYN. *Hymenolepis platyrhynchos*.

A. quercifolium (oak-leaved).* *rhiz.* stout, wide creeping. *sti.* of barren fronds 1in. to 2in. long, clothed with brownish hairs. *barren fronds* 3in. to 4in. long, 1½in. to 2in. broad, the terminal pinnæ with blunt rounded lobes. *fertile fronds* with a terminal pinna, 1in. to 2in. long, one line broad, and a pair of smaller lateral ones, with slender stipes 6in. to 9in. long, hairy at the base. Ceylon. Stove species. SYNS. *A. Neitnerii* (of gardens), *Gymnopteris quercifolia*.

A. scandens (climbing).* *rhiz.* woody, wide climbing. *sti.* 3in. to 4in. long, firm, erect, naked. *fronds* 1ft. to 3ft. long, 1ft. or more broad, simply pinnate; barren pinnæ, 4in. to 8in. long, ¾in. to 1½in. broad, acuminate, the edge thickened and serrulate, the base cuneate, sessile, or slightly stalked, articulated; fertile pinnæ, 6in. to 12in. long, one and a half to two lines broad, the lower ones distant. Himalayas, &c., 1841. Stove or greenhouse species. SYN. *Stenochlæna scandens*.

A. scolopendrifolium (scolopendrium-leaved).* *rhiz.* woody, creeping, scaly. *sti.* 4in. to 12in. long, firm, erect, densely clothed with blackish scales. *barren fronds* often 1ft. long, 1½in. to 3in. broad, simple, acute, the base narrowed gradually; edge and

midrib scaly. *fertile fronds* much smaller than the barren ones. Guatemala, &c. Stove species. SYN. *A. barbatum*.

A. serratifolium (serrate-leaved). *rhiz.* woody, short creeping. *sti.* of barren fronds 12in. to 18in. long, slightly scaly. *barren fronds* 2ft. long, 6in. to 12in. broad, with numerous sessile pinnæ on each side, 3in. to 6in. long, ¾in. to 1½in. broad, inciso-crenate, the base cuneate; fertile pinnæ distant, 2in. to 3in. long, ¼in. to ½in. broad, blunt, entire. Venezuela, &c. Stove species. SYN. *Chrysodium serratifolium*.

A. simplex (simple-leaved). *rhiz.* woody, creeping, scaly. *sti.* 1in. to 4in. long, firm, erect, naked. *barren fronds* 4in. to 12in. long, about 1½in. broad, very acute, the lower part narrowed very gradually. *fertile fronds* narrower than the barren ones, with longer stipes. Cuba to Brazil, 1798. Stove species. SYN. *Elaphoglossum simplex*.

A. sorbifolium (service-leaved).* *rhiz.* thick, woody, often 30ft. to 40ft. long, clasping trees like a cable, sometimes prickly. *fronds* 12in. to 18in. long, 6in. to 12in. broad, simply pinnate; barren pinnæ 4in. to 6in. long, about ½in. broad, three to twenty on each side, articulated at the base, entire or toothed; fertile

pinnæ 1in. to 2in. apart, 2in. to 4in. long, about ¼in. broad. West Indies, 1793. There are several varieties of this species, chiefly differing in the number of pinnæ. Stove species. SYN. *Stenochlæna sorbifolia*.

A. s. cuspidatum (cuspidate).* This is only a variety of the above species with long-stalked, ligulate-cuspidate pinnæ; but it is usually regarded as a distinct species in gardens.

A. spathulatum (spoon-shaped). *sti.* tufted, 1in. to 2in. long, firm, erect, scaly. *barren fronds* ½in. to 4in. long, ¼in. to ½in. broad, obovate-spathulate, blunt, tapering narrowly or gradually at the base, with a coriaceous texture; both surfaces and the margins copiously scaly. *fertile fronds* smaller than the barren, with longer stipes. Tropical America, South Africa, &c. Stove species. SYN. *A. piloselloides*.

A. spicatum (spiked). *rhiz.* woody, short creeping. *sti.* 1in. to 2in. long, firm. *fronds* 6in. to 18in. long, ½in. to 1in. broad, the upper part contracted and fertile, entire, the lower part narrowed very gradually. Himalayas, &c. Greenhouse species. SYN. *Hymenolepis brachystachys*.

A. squamosum (scaly).* *rhiz.* woody, densely scaly. *sti.* 2in. to 4in. long, densely clothed with pale or dark-coloured scales. *barren fronds*

6in. to 12in. long, about 1in. broad, simple, acute, the base narrowed gradually; both sides matted, and the edge densely ciliated with reddish scales. *fertile fronds* as long as the barren ones, but much narrower, the stipes much longer. Widely distributed in both hemispheres. Stove or greenhouse species. SYN. *A. paleaceum.*

A. subdiaphanum (semi-transparent).* *cau.* woody, erect. *sti.* tufted, 2in. to 6in. long, firm, erect, scaly. *barren fronds* 4in. to 8in. long, 1in. to 1½in. broad, simple, both ends narrowed, the edge entire. *fertile fronds* much narrower, on longer stipes. St. Helena. Greenhouse species. SYN. *Aconiopteris subdiaphana*.

A. subrepandum (slighty-waved).* *rhiz.* woody, wide-creeping. *sti.* of barren fronds stout, erect, nearly naked. *barren fronds* from 1ft. to 2ft. long, 2in. to 12in. broad, copiously pinnate, with linear-oblong entire or subrepand pinnæ on each side, which are sometimes 6in. to 8in. long, and 2in. broad. *fertile fronds* like the others, but smaller. Isle of Luzon, &c. Stove species. SYN. *Gymnopteris subrepanda*.

A. taccæfolium (yew-leaved).* *cau.* woody, densely scaly. *sti.* of barren fronds 1in. to 4in. long, scaly. *barren*

fronds from 1ft. to 2ft. long, 3in. to 12in. broad, simple, oblong-lanceolate, entire, copiously pinnate, with oblong-lanceolate pinnæ, 1in. to 6in. long, ½in. to 1½in. broad, the upper ones narrowly decurrent, the lower ones forked at the base on the under side. *fertile fronds* simple, 6in. to 12in. long, ⅛in. broad, or pinnate, with forked linear pinnæ. The three-lobed form of this species is sometimes known as *A. trilobum*. Philippines. Stove species. SYN. *Gymnopteris taccæfolia*.

A. tenuifolium (narrow-leaved).* *rhiz.* wide scandent, woody, slightly scaly. *barren fronds* simply pinnate, the stipes 4in. to 6in. long, naked, firm, erect, the fronds 3ft. to 5ft. long, 12in. to 18in. broad; pinnæ 6in. to 9in. long, ¾in. to 1½in. broad, acuminate, the edge thickened and serrulate, short-stalked. *fertile fronds* bipinnate, with longer stipes; pinnæ long-stalked, with numerous distant pinnules. South Africa. Stove or greenhouse species. SYNS. *A. Meyerianum* and *Stenochlæna tenuifolia*.

A. trilobum (three-lobed). A form of *A. taccæfolium*.

A. villosum (hairy).* *rhiz.* woody, densely scaly. *sti.* 2in. to 4in. long, slender, densely clothed with scales. *barren fronds* 6in. to 9in. long, 1in.

to 1½in. broad, acute, the lower part narrowed gradually; both surfaces scaly, and the edge more or less ciliated. *fertile fronds* much smaller than the others. Mexico, &c. Stove species.

A. viscosum (clammy).* *rhiz.* woody, creeping, densely scaly. *sti.* 3in. to 6in. long, firm, erect, scaly, often viscous. *barren fronds* 6in. to 12in. long, ½in. to 1in. broad, simple, acute, the lower part narrowed gradually; both surfaces more or less viscid, and minutely scaly. *fertile fronds* smaller, with longer stipes. Tropical America and the tropics of the Old World, 1826. Very variable in form. Stove species.

ACROTRICHE (from *akros*, top, *i.e.*, outermost—and *thrix*, a hair; the tips of the petals are bearded). ORD. *Epacridaceæ*. A genus of eight or nine species of dwarf, much branched, ornamental greenhouse evergreen shrubs. Flowers white or red; spikes axillary, short; corolla funnel-shaped; petals with deflexed hairs at apex. Cultivated in an equal mixture of sandy loam and peat, and propagated by cuttings made of the young shoots, pricked in sand, covered with a bell glass, and placed in a cool house; afterwards treated like *Epacris*.

A. cordata (heart-leaved).* *fl.* white, small, axillary, twin, or solitary. April. *l.* cordate, flat, striated below. *h.* 1ft. New Holland, 1823.

A. divaricata (straggling).* *fl.*

white, small, in axillary spikes. May. *l.* lanceolate, mucronate, divaricate, flat, both surfaces green. *h.* 6in. to 1ft. New South Wales, 1824.

A. ovalifolia (oval-leaved). *fl.* white, small, in axillary spikes. March. *l.* ovate and oval, obtuse, flat, with smooth margins. *h.* 6in. to 1ft. New Holland, 1824.

ACTÆA (from *aktaia*, an Elder; in allusion to the resemblance of the foliage to that of the Elder). Baneberry. ORD. *Ranunculaceæ*. A small genus of perennial herbaceous plants, with bi- or triternate leaves, and long, erect racemes of whitish flowers, which are succeeded by poisonous berries. They are excellent subjects for shady places, beneath trees, or in the wild garden. Easily increased by division of the roots, and seed during spring.

A. alba (white).* *fl.* white; racemes simple. May, June. *l.* ovate-lanceolate, serrate or cut. Berries white, ovate-oblong, *h.* 1ft. to 1½ft. N. America.



Fig. 23. Actæa spicata, showing Habit and Raceme of Flowers.

A. spicata (spiked).* *fl.* white, or bluish; racemes ovate. Summer. *l.* bi- or triternate, serrated. Berries oblong, black, poisonous. *h.* 1ft. England. See Fig. 23.

A. s. rubra (red).* This differs from the type in having bright red berries, which are disposed in dense clusters on spikes overtopping the foliage. North America. A very handsome hardy perennial.

ACTINELLA (from *aktin*, a ray; small rayed). Syn. *Picradenia*. Ord. *Compositæ*. A small genus of hardy herbaceous plants, having radiate capitules. The only species worth cultivating is *A. grandiflora*. It thrives in an open border with a light soil. Increased by divisions of the root in spring.

A. grandiflora (large-flowered).* *fl.-heads* yellow, large, and handsome, 3in. in diameter. Summer. *h.* 6in. to 9in. Colorado. A very pretty branched perennial, suitable for the alpine garden.

A. lanata (woolly). *See* **Eriophyllum cæspitosum**.

ACTINIDIA (from *aktin*, a ray; the styles radiate like the spokes of a wheel). ORD. *Ternstrœmiaceæ*. A genus of ornamental hardy deciduous climbing shrubs, with axillary corymbs of flowers; sepals and petals imbricate. Leaves entire. Excellent for trellis-work or walls, and thriving best in a light rich soil. Increased by seeds, layers, or cuttings; the latter should be put in under a hand light in autumn, in sandy soil.



FIG. 24. ACTINIDIA VOLUBILIS.

A. Kolomikta (Kolomikta).* *fl.* white, solitary, axillary, or cymose, ½in. in diameter; peduncles about ½in. long. Summer. *l.* ovate-oblong, petiolate, rounded or sub-cordate at

the base, and tapering into a long point, serrate; the autumnal tints are very handsome, changing to white and red. N. E. Asia, 1880. Rarely met with.

A. polygama (polygamous). *fl.* white, fragrant. Summer. *l.* cordate, serrate, petiolate. Japan, 1870. The berries of this species are edible.

A. volubilis (twining).* *fl.* white, small. June. *l.* oval on flowering branches, elliptic on climbing stems. Japan, 1874. A very free growing species. See Fig. 24.

ACTINIOPTERIS (from *aktin*, a ray, and *pteris*, a fern; the fronds are radiately cut into narrow segments). ORD. *Filices*. Sori linear-elongated, sub-marginal; involucres (= indusia) the same shape as the sorus, folded over it, placed one on each side of the narrow segments of the frond, opening towards the midrib. A small genus of beautiful and distinct stove ferns. They thrive in a compost of equal parts crocks and charcoal, about the size of peas, which must be mixed with silver sand and a very small portion of loam and peat. About half the pot should be filled with crocks, perfect drainage being necessary. A moist atmosphere is also essential, and the plants may be syringed two or three times a day. A mean summer temperature of 78deg. to 80deg., with a night one of not less than 65deg., is desirable. In winter, a mean temperature of about 73deg., and a night one of not less than 60deg., should be maintained.

A. radiata (rayed).* *sti.* densely

tufted, 2in. to 6in. long. *fronds* fan shaped, 1in. to 1½in. each way, composed of numerous dichotomous segments, half line broad, those of the fertile frond longer than those of the barren one. India, &c. (very widely distributed), 1869. In form this elegant little species is a perfect miniature of the Fan Palm, *Latania borbonica*.

A. r. australis (southern).* *fronds*, segments fewer, larger, and subulate at the point. Plant much larger and more vigorous.

ACTINOCARPUS (from *aktin*, a ray, and *karpos*, fruit; referring to the curiously radiated fruit, resembling a star fish). ORD. *Alismaceæ*. Pretty little aquatic perennials, with habit and inflorescence of *Alisma*. Carpels six to eight, connate at base, spreading horizontally. Excellent for naturalising in bogs and pools. Increased by seeds and divisions during spring.

A. Damasonium (Damasonium). Ray Pod. *fl.* white, very delicate; each petal has a yellow spot at the base; scapes with a terminal umbel. June. *l.* radical, on long petioles, sometimes floating, elliptical, five-nerved. A native aquatic. The proper name of this plant is *Damasonium stellatum*.

A. minor (smaller).* This greenhouse species, also with white flowers, from New South Wales, is

smaller.

ACTINOMERIS (from *aktin*, a ray, and *meris*, a part; referring to the radiated aspect of the plants). SYN. *Pterophyton*. ORD. *Compositæ*. A small genus of herbaceous perennials allied to *Helianthus*, but with compressed and winged achenes. Flower-heads corymbose, Coreopsis-like. Leaves ovate or lanceolate, serrate. They are hardy, ornamental plants, and of easy cultivation, in a loamy soil. Increased in spring, by seeds and division of the roots, on a warm border, with or without hand lights, or in cold frames. With the exception of *A. helianthoides*, they are but little known in this country.

A. alata (wing-stalked). *fl.-heads* yellow. July. *h.* 3ft. America. 1803.

A. helianthoides (sunflower-like).* *fl.-heads* yellow, 2in. across, July to September. *h.* 3ft. S. America, 1825.

A. procera (tall).* *fl.-heads* yellow. September. *h.* 8ft. N. America, 1766.

A. squarrosa (rough-headed).* *fl.-heads* yellow, in loose terminal panicles. July and August. *l.* decurrent, broadly lanceolate, coarsely toothed. Stem square, winged. *h.* 3ft. North America, 1640. SYN. *Verbesina Coreopsis*.

ACTINOPHYLLUM. *See* **Sciadophyllum**.

ACTINOSTACHYS. Included under **Schizæa** (which *see*).

ACTINOTUS (from *actinotos*, furnished with rays; referring to the involucre). ORD. *Umbelliferæ*. An Australian genus of greenhouse herbaceous perennials. Flowers shortly pedicellate, numerously disposed in simple umbels; petals none. Leaves alternate, petiolate. They thrive best in loam and peat, and are increased by root division and seeds. The latter should be sown on a hotbed, in spring, and in May the seedlings may be transplanted out in the open border in a warm situation, where they will flower and seed freely.

A. helianthus (sunflower).* *fl.* white, in many-flowered capitate umbels; involucre many leaved, radiating, longer than the flowers. June. *l.* alternate, bipinnatifid; lobules bluntish. *h.* 2ft. 1821. SYN. *Eriocalia major*.

A. leucocephalus (white-headed). *fl.* white. June. *h.* 2ft. 1837.



Fig. 25. Ada aurantiaca.

ACULEATUS. Armed with prickles.

ACULEOLATUS. Armed with small prickles.

ACULEUS. A prickle; a conical elevation of the skin of a plant, becoming hard and sharp-pointed.

ACUMEN. An acute terminal angle.

ACUMINATE. Extended into an acute terminal angle; this word is confined to considerable extension.

ACUNNA OBLONGA. *See* **Bejaria æstuans.**

ACUTE. Sharp-pointed.

ACYNTHA. A synonym of **Sanseviera** (which *see*).

ADA (a complimentary name). ORD. *Orchideæ*. An evergreen orchid, very closely allied to *Brassia*, from which it differs chiefly in having the lip parallel with, and solidly united to, the base of the column. Some authorities now refer the plant to the genus *Mesospinidium*. It requires to be potted in peat and sphagnum, in equal parts. The drainage must be perfect, and, during summer, the water supply profuse. Although in winter far less will suffice, the plant should not be allowed to become dry. Propagated by divisions as soon as the plant commences growth.

A. aurantiaca (orange).* *fl.* orange-scarlet, in long terminal nodding racemes, each bearing from six to ten blossoms; petals elongated, streaked with black inside. Winter and spring. *l.* two or three to each plant, linear, dark green, about 6in. in length. Habit erect, with somewhat cylindrical pseudo-bulbs, which taper upwards. See Fig. 25.

ADAMIA (named after John Adam, some time Governor-General of India, and a promoter of natural history). ORD. *Saxifrageæ*. A small genus of Hydrangea-like greenhouse evergreen shrubs, having many flowered terminal corymbs of flowers, and opposite, petiolate, oblong-lanceolate, serrated leaves. They thrive well in a mixture of loam, peat, and sand; and cuttings will root readily in a similar compost, under a hand glass.

A. cyanea (blue-berried). *fl.* whitish,

or pink. June. *h.* 6ft. Nepaul, in rocky places, 1829.

A. sylvatica (wood). *fl.* blue; cymes nearly undivided, on short peduncles, disposed in a close panicle. June. *h.* 6ft. Java, 1846.

A. versicolor (many-coloured). *fl.* blue. August. China, 1844.

ADAM'S APPLE. *See* **Citrus Limetta** and **Musa paradisiaca**.

ADAMSIA. *See* **Geum**, **Puschkinia**, **Sieversia**.

ADAM'S NEEDLE. *See* **Yucca**.

ADANSONIA (named after Michael Adanson, an eminent French botanist). Baobab Tree. ORD. *Sterculiaceæ*. This is reputed to be one of the largest trees in the world, as far as the girth of the trunk is concerned; but it is seldom seen in cultivation in this country.

A. digitata (finger-leaved). *fl.* white, about 6in. across, with purplish anthers, on long, axillary, solitary pedicels. *l.* palmate, with three leaflets in the young plants, and five to seven in adult ones. *h.* 40ft. Africa.

ADDER'S FERN. *See* **Polypodium vulgare**.

ADDER-SPIT. *See* **Pteris aquilina**.

ADDER'S TONGUE. *See* **Ophioglossum**.

ADELOBOTRYS (from *adelos*, obscure, and *botrys*, a cluster). ORD. *Melastomaceæ*. Stove climbing shrubs

with terete branches. Flowers white, crowded in cymose heads at the tops of the branches. Leaves clothed with rufous hairs on both surfaces when young, but in the adult state glabrous, except the nerves, petiolate, ovate, cordate, acuminated, ciliately serrated, five-nerved. For general culture, *see* **Pleroma**.

A. Lindeni (Linden's).* *fl.* white, changing to purple. Brazil, 1866.

A. scandens (climbing).* This, the original species, possibly not now in cultivation, is a native of French Guiana.

ADENANDRA (from *aden*, a gland, and *aner*, a male; the anthers terminate in a globose gland). ORD. *Rutaceæ*. Very beautiful little greenhouse shrubs from the Cape of Good Hope. Flowers large, usually solitary at the tops of the branches; stamens ten, the five opposite the petals sterile, five fertile ones similar in form, but shorter. Leaves usually alternate, flat, glandularly dotted. They thrive in a mixture of sand and peat, with a little turfy loam. The young tops, before they begin to throw out their buds, made into cuttings, and planted in a pot of sand, with a bell glass placed over them, will root without bottom heat.

A. acuminata (acuminate). Synonymous with *A. amœna*.

A. amœna (pleasing).* *fl.* large, whitish above, and reddish beneath, solitary, sessile, terminal. June. *l.* scattered, oblong or oval, bluntish, smooth, dotted beneath. *h.* 1ft. to

2ft. 1798. SYN. *A. acuminata*.

A. coriacea (leathery-leaved). *fl.* large, pink, usually solitary on the tops of the branches. June. *l.* scattered, oblong, obtuse, revolute, quite smooth. *h.* 1ft. to 2ft. 1720.

A. fragrans (fragrant).* *fl.* rose colour, on long peduncles, fragrant; pedicels clammy, aggregate, umbellate. May. *l.* scattered, smooth, spreading very much, ovate-oblong, glandular, a little crenulated. *h.* 1ft. to 2ft. 1812.

A. linearis (linear-leaved). *fl.* white, terminal, on long, usually solitary, pedicels. June. *l.* opposite, linear, obtuse, spreading; branches and pedicels smooth. *h.* 1ft. 1800.

A. marginata (margined).* *fl.* pale flesh-colour, on long peduncles; umbels terminal. June. *l.* scattered, smooth, transparent, cordate, lower ones ovate, upper ones lanceolate. *h.* 1ft. to 2ft. 1806.

A. umbellata (umbel-flowered).* *fl.* pink, almost sessile, terminal, umbellate, petals fringed. June. *l.* oblong or obovate, dotted beneath, fringed on the edges. *h.* 1ft. to 2ft. 1790.

A. u. speciosa (showy).* *fl.* large, pink, nearly sessile, terminal, umbellate. June. *l.* scattered, oblong

or obovate, revolute, dotted beneath, smooth, but a little fringed on the edges. *h.* 1ft. to 2ft. 1790.

A. uniflora (one-flowered).* *fl.* large, whitish inside, and pinkish outside, nearly sessile, solitary, terminal. June. *l.* scattered, oblong-lanceolate, somewhat pointed, revolute, smooth, dotted beneath. *h.* 1ft. to 2ft. 1775.

A. villosa (shaggy).* *fl.* pink, nearly sessile, terminal, umbellate; sepals, petals, and stamens fringed. June. *l.* crowded, ovate-oblong, fringed, pubescent and glandular beneath. *h.* 1ft. to 2ft. 1786.

ADENANTHERA (from *aden*, a gland, and *anthera*, an anther; in reference to the anthers, which are each terminated by a deciduous, pedicellate gland). ORD. *Leguminosæ*. A small genus of stove evergreen trees, with racemose spikes of small flowers and bipinnate or decompound leaves. They thrive well in a mixture of peat and loam. Increased by cuttings, which should be taken off at a joint and planted in heat in a pot of sand, placing a bell glass over them.

A. chrysostachys (golden-spiked). *fl.* golden. *h.* 15ft. Mauritius, 1824.

A. falcata (sickle-shaped). *fl.* yellowish. *h.* 6ft. India, 1812.

A. pavonina (peacock-like).* Peacock Flower Fence. *fl.* white and yellow mixed. May. *l.* leaflets oval, obtuse, glabrous on both surfaces. *h.*

5ft. India, 1759.

ADENANTHOS (from *aden*, a gland, and *anthos*, a flower; referring to the glands on the flowers). ORD. *Proteaceæ*. Ornamental greenhouse evergreen pilose shrubs, thriving in sandy peat. Propagated in spring by cuttings, which should be placed in sandy soil under a bell glass, with a gentle bottom heat.

A. barbigera (bearded).* *fl.* red, axillary, solitary, pedunculate; perianth pilose, bearded at top; involucre spreading, villous. June. *l.* oblong-lanceolate, obtuse, triple-nerved. *h.* 7ft. Swan River, 1845.

A. cuneata (wedge-leaved). *fl.* red. July. *h.* 5ft. New Holland, 1824.

A. obovata (obovate-leaved).* *fl.* red. July. *h.* 5ft. New Holland, 1826.

ADENIUM (from Aden, where it is found). ORD. *Apocynaceæ*. Greenhouse evergreen succulent shrubs. The species mentioned below is remarkable in having a globose thick caudex or stem; branches dichotomous; corolla salver-shaped. They require a well-drained compost of sand and loam. Half-ripened cuttings strike root readily in sand, under a hand glass. But little water is required when the plants are not in a growing state.

A. obesum (fat). *fl.* pinky-crimson, downy; corymbs terminal, many-flowered; pedicels short. June. *l.* close together at the tops of the branches, 3in. long, oblong, narrowed at the base, abruptly

terminated by a hard, short point. *h.* 3ft. or 4ft. Aden, 1845.

ADENOCALYMNA (from *aden*, a gland, and *calymna*, a covering; referring to the conspicuous glands on the leaves and floral coverings). ORD. *Bignoniaceæ*. An elegant genus of stove evergreen climbers. Flowers racemose, trumpet-shaped, bracteate. Leaves ternate or binate. Stems slender. They require a hot and moist temperature to grow them successfully, and thrive best in a compost of loam and peat. Cuttings will root in sand, if placed under a bell glass, with bottom heat.

A. comosum (hairy).* *fl.* yellow; racemes spicate, axillary, and terminal; bracts comose. September. *l.* trifoliate and conjugate, tendrilled; leaflets ovate, leathery, glandular. *h.* 10ft. Brazil, 1841.

A. longeracemosum (long-racemed). *fl.* yellow. October. Brazil.

A. nitidum (shining).* *fl.* yellow; racemes axillary, nearly terminal, velvety; corolla velvety; bracts narrow, glandular. February. *l.* trifoliate or conjugate, tendrilled; leaflets elliptic, oblong. *h.* 10ft. Brazil, 1848.

ADENOCARPUS (from *aden*, a gland, and *karpos*, a fruit; in reference to the legumes being beset with pedicellate glands). ORD. *Leguminosæ*. Shrubs, with numerous racemes of yellow flowers; divaricate branches, trifoliate usually aggregate leaves, having petiolar stipulas, and complicated leaflets. All the

species are elegant when in flower, and well suited for ornamenting the fronts of shrubberies. Except where otherwise mentioned, all are hardy. They thrive best in a mixture of loam, peat, and sand; and may be readily increased by seeds or layers, or by grafting the rarer on the commoner kinds. Young cuttings will root freely in sand, covered by a hand glass, which should be taken off and wiped occasionally. Seeds may be sown in March, the hardy species out of doors, and the others in a cold house.

A. foliolosus (slightly-leaved).* *fl.* yellow; racemes terminal; calyx covered with glandless hairs, with the lower lip elongated and trifid at the apex; the segments equal. May. *l.* (and branches) much crowded, hairy, trifoliate. *h.* 4ft. to 6ft. Canary Islands, 1629. A half-hardy evergreen species.

A. frankenioides (frankenia-like).* *fl.* yellow, crowded; racemes terminal; calyx beset with glandular pubescence, with the lower lip having the middle segment longer than the lateral ones, and exceeding the lower lip. April. *l.* trifoliate, much crowded, hairy; branches velvety. *h.* 1ft. to 3ft. Teneriffe, 1815. Requires protection in winter; an evergreen.

A. hispanicus (Spanish).* *fl.* yellow, crowded; racemes terminal; calyx beset with glands and hairs; lower lip of calyx with three equal segments, hardly longer than the

upper lip. June. *l.* trifoliate, grouped; branchlets hairy. *h.* 2ft. to 4ft. Spain, 1816. Deciduous.

A. intermedius (intermediate).* *fl.* yellow, not crowded; racemes terminal; calyx beset with glandular pubescence, with the lower lip trifid, the lateral segments shorter than the middle ones, and much exceeding the upper lip. May. *l.* trifoliate, grouped; branches rather shaggy. *h.* 3ft. to 4ft. Sicily and Naples, on mountains, 1816. Deciduous.

A. parvifolius (small-leaved).* *fl.* yellow, not crowded; racemes terminal; calyx clothed with glandular pubescence, with the middle segment of the lower lip longer than the lateral ones, much exceeding the upper lip. May. *l.* trifoliate, grouped, small; branches glabrous. *h.* 3ft. to 4ft. France, on exposed heaths, 1800. Deciduous.

A. telonensis (Toulon).* *fl.* yellow, not crowded; racemes terminal; calyx clothed with glandless pubescence, the segments of the lower lip about equal in length, a little longer than the upper lip. June. *l.* trifoliate, grouped; branchlets smoothish. *h.* 2ft. to 4ft. South France, 1800. Deciduous.

ADENOPHORA (from *aden*, a gland, and *phoreo*, to bear; in reference to the cylindrical nectary which

girds the base of the style). ORD. *Campanulaceæ*. A genus of elegant hardy border perennials, very similar in habit, shape of flower, &c., to *Campanula*, from which genus *Adenophora* differs in having the style surrounded by a cylindrical gland. Flowers stalked, drooping, spicate. Leaves broad, stalked, somewhat whorled. They grow best in light rich garden soil, with a warm sunny position, and should be increased by seeds, as dividing the roots is the sure way to lose them. They are easily raised from seeds, which may be sown as soon as ripe, or in spring, in pots placed in a cold frame.

A. coronopifolia (buckhorn-leaved).* *fl.* blue, large, three to ten, racemose, at the top of the stem, on short pedicels. July. *l.* radical ones petiolate, ovate-roundish, cordate, crenately toothed; upper ones sessile, linear-lanceolate, nearly entire, quite glabrous. *h.* 1ft. to 2ft. Dahuria, 1822.

A. denticulata (toothed-leaved).* *fl.* blue, small, numerous, on short pedicels, disposed in a more or less loose elongated raceme. July. *l.* serrated, smoothish; radical ones petiolate, rounded; upper ones sessile, ovate-lanceolate. *h.* 1½ft. Dahuria, 1817. SYN. *A. tricuspidata*.

A. Fischeri (Fischer's).* *fl.* blue, or whitish blue, numerous, sweet-scented, disposed in a more or less compound, elongated, and loose pyramidal panicle. August. *l.* radical ones petiolate, ovate-roundish,

cordate, crenately toothed; upper ones sessile, ovate-lanceolate, coarsely serrated. *h.* 1½ft. Siberia, 1784. SYN. *A. liliiflora*.

A. Gmelini (Gmelin's). *fl.* blue, secund, three to ten, on the top of each stem, rising from the axils of the upper leaves, disposed in a long raceme. July. *l.* upper ones erect, linear, very narrow, entire, glabrous. *h.* 1ft. to 2ft. Dahuria, in dry stony places, 1820.

A. intermedia (intermediate). *fl.* pale blue, small, racemose. May. *l.* radical ones petiolate, cordate, toothed; upper ones lanceolate, tapering to a point at the base, serrated, crowded. *h.* 3ft. Siberia, 1820.

A. Lamarckii (Lamarck's).* *fl.* blue; corolla funnel-shaped, disposed in an elongated, many-flowered, raceme, which is compound at the base. June. *l.* ovate-lanceolate, acutely serrated, ciliated, glabrous, except on the margins. *h.* 1ft. to 2ft. Eastern Europe, 1824.

A. latifolia (broad-leaved). Synonymous with *A. pereskiæfolia*.

A. liliiflora (lily-flowered).* *fl.* numerous, sweet-scented, in a loose pyramidal panicle. Central and Eastern Europe.

A. pereskiæfolia (pereskia-leaved).*

fl. blue, rather numerous, scattered over the upper part of the stems, rarely subverticillate; peduncles one to two, or three-flowered. July. *l.* three to five in a whorl, ovate-oblong, acuminated, coarsely serrated, roughly ciliated. *h.* 1½ft. Dahuria, 1821. SYN. *A. latifolia*.

A. periplocæfolia (periploca-leaved). *fl.* pale blue, at the top of the stem, sometimes only one. June. *l.* petiolate, ovate, acute, somewhat cordate, crenately serrated. Stem ascending. *h.* 3in. Siberia, 1824. Rockery species.

A. stylosa (long-styled).* *fl.* pale blue, small, few, disposed in a loose, naked, raceme. May. *l.* petiolate; lower ones obovate, sinuate; upper ones ovate, acuminated, glabrous. Stem ascending. *h.* 1ft. to 1½ft. Eastern Europe, 1820.

A. tricuspidata (three-cusped). Synonymous with *A. denticulata*.

A. verticillata (whorl-leaved).* *fl.* pale blue, small, irregularly disposed at the tops of the stems; lower whorls many flowered, distant; peduncles one to three-flowered. June. *l.* in whorls, serrately toothed; radical ones petiolate, roundish; upper ones ovate-lanceolate; stems simple. *h.* 2ft. to 3ft. Dahuria, 1783.

ADENOSTOMA (from *aden*, a gland, and *stoma*, a

mouth). ORD. *Rosaceæ*. Hardy shrubs, having small racemose, five-petalled flowers. They grow freely in rich loam and peat in equal proportions. Propagated in spring or autumn, by cuttings made of the young shoots, placed in sand, under glass.

A. fasciculata (fascicled).* *fl.* white, small, produced in terminal panicles. *h.* 2ft. California, 1848. A hardy, heath-like evergreen bushy plant, allied to *Alchemilla*.

ADESMIA (from *a*, without, *desmos*, a bond; in reference to the stamens being free). ORD. *Leguminosæ*. Chiefly greenhouse evergreen shrubs, or trailers, from South America, with lanceolate stipulas, abruptly pinnate leaves, ending in a bristle; axillary one-flowered pedicels, or the flowers racemosely disposed at the tops of the branches, in consequence of the upper leaves being abortive. They will grow well in a mixture of loam, peat, and sand. Propagated by cuttings placed in sand, covered by a hand glass, in a gentle heat; or by seeds, which are generally more satisfactory. The annual species—*A. muricata*, *A. papposa*, and *A. pendula*—are not worth growing. The following are fairly representative of the most ornamental species.

A. glutinosa (sticky).* *fl.* yellow; racemes elongated, terminal, simple, spinescent, and are (as well as the linear bracteas) clothed with white hairs. May. *l.* with about three pairs of elliptic, hairy leaflets; branches spreading, beset with glandular, glutinous hairs. Stem shrubby; legumes three-jointed, very long. *h.*

1ft. to 2ft. 1831.

A. Loudonii (Loudon's). *fl.* yellow. May, *h.* 2ft. Valparaiso, 1830.

A. microphylla (small-leaved).* *fl.* yellow; racemes somewhat capitate, terminal, simple, spinescent. June. *l.* with six pairs of small orbicular leaflets, on short petioles, pubescent; branches spinose. Stem shrubby. *h.* 1ft. to 2ft. 1830.

A. Uspallatensis (Uspallatan). *fl.* yellow. July. *h.* 1ft. China, 1832.

A. viscosa (clammy). *fl.* yellow. August. *h.* 12ft. Chili, 1831.

ADHATODA (its native name). ORD. *Acanthaceæ*. Allied to *Justicia*. Very ornamental stove shrubs, requiring a good fibrous peat and loam, with a moderate addition of silver sand. To grow them well, they require liberal treatment and plenty of heat, when the flowers will be produced in great profusion. Increased by young cuttings in spring, placed in sandy soil, in bottom heat. *See* **Justicia**.

A. cydoniæfolia (quince-leaved).* *fl.* produced in rather dense clusters at the point of every branch; tube of corolla white, the upper lip white tipped with purple; the lower lip large, rich deep purple, with a white stripe down the centre. October. *l.* opposite, ovate, dark green, and are, as well as the branches, slightly downy. Brazil, 1855. This species is an excellent subject for training up

pillars or rafters; and, when in bloom, makes a pretty basket plant. It has a somewhat straggling habit, but a little care only is needed in pruning and training to grow it into an elegant shape.

A. vasica (Vasica). *fl.* purple. July. *h.* 10ft. India, 1699.

ADHERENT. Strictly signifies sticking to anything, but is more commonly employed in the sense of adnate.

ADHESION. The union of parts usually distinct.

ADIANTOPSIS. *See* **Cheilanthes**.

ADIANTUM (from *adiantos*, dry, as if plunged in water it yet remains dry). Maidenhair. ORD. *Filices*. A large genus of handsome tropical and temperate ferns. *Sori* marginal, varying in shape from globose to linear, usually numerous and distinct, sometimes confluent and continuous. Involucre the same shape as the sorus, formed of the reflexed margin of the fronds, bearing the capsules on its upper side. None of the Adiantums are truly hardy except the American *A. pedatum*; even our own native species requires protection. The chief requirements of this handsome genus of ferns are good drainage, and a compost of fibrous peat, loam and sand. In most cases, plenty of pot room is essential, and a larger quantity of loam will be needed for strong-growing sorts. For general culture, *see* **Ferns**.

A. æmulum (rival).* *sti.* slender, about 6in. long. *fronds* slender, pyramidate, tri-subquadripinnate; pinnæ distinct, obliquely

pyramidate, unequally-sided; pinnules rhomboid or oblong, tapering to the base, the terminal one distinctly cuneate, all sparingly lobate. *sori*, 2in. to 4in., circular, or nearly so. Brazil, 1877. Stove or greenhouse species.

A. æthiopicum (Æthiopian).* *sti.* 6in. to 9in. long, rather slender, erect. *fronds* 12in. to 18in. long, 6in. to 9in. broad, deltoid, tri- or quadripinnate; lower pinnæ 3in. to 4in. long, 2in. to 3in. broad, deltoid; ultimate segments ¼in. to ½in. across, ¼in. deep, suborbicular, the upper part broadly lobed; rachis and surfaces naked. *sori* in several roundish patches. *A. Chilense* (Chilian), *A. scabrum* (scurfy), *A. sulphureum* (sulphured) are mere forms of this species. Spain, and almost cosmopolitan. A very pretty greenhouse fern. SYNS. *A. assimile*, *A. emarginatum*.

A. affine (related).* *sti.* 6in. to 9in. long, erect. *fronds* with a terminal central pinna 4in. to 6in. long, 1in. to 1½in. broad, and several smaller erecto-patent lateral ones, the lowest of which are again branched; pinnules, ½in. to ¾in. long, ¼in. deep, dimidiate, the lower edge straight, the upper nearly parallel with it, crenate, like the oblique or bluntly rounded outer edge. *sori*

numerous, roundish. New Zealand. Greenhouse species. SYN. *A. Cunninghami*.

A. amabile (lovely). Synonymous with *A. glaucophyllum*. Also a garden name for *A. Moorei*.

A. amœnum (pleasing). Synonymous with *A. flabellulatum*.

A. andicolum. A synonym of *A. glaucophyllum*.

A. aneitense (Aneiteum).* *sti.* and *rachises* castaneous, the latter glabrous beneath, ferrugino-pilose above; *fronds* deltoid, three to four pinnate, 1½ft. to 2ft. long, and broad; segments, about ½in. long, rhomboidal, ascending, nearly sessile, inner side close to rachis, lower erecto-patent, shallowly lobed. *sori* round, reniform, in centre of lobes, four to six to a segment. Aneiteum Isles, 1880. Stove or greenhouse species.

A. assimile (assimilated). An Australian form of the widely-distributed *A. æthiopicum*.

A. Bausei (Bause's).* *fronds* 1½ft. to 2½ft. long, spreading, triangular, tri-quadripinnate; pinnæ stalked, the lower ones obliquely triangular; pinnules broad, laterally deflexed, the basal ones obliquely ovate with a truncate base, the intermediate somewhat trapeziform, the terminal

cuneate—all shallowly lobed and pedicellate. *sori* oblong reniform, set across the apices of the lobes, 1879. A beautiful stove or greenhouse hybrid, between *A. trapeziforme* and *A. decorum*.

A. bellum (handsome).* *fronds* tufted, 3in. to 6in. high, bipinnate. ovate-lanceolate; pinnæ of three to six pinnules, ½in. to 1½in. long, stalked; pinnules cuneate or irregular transverse-oblong, the somewhat larger terminal ones cuneate, lobed, the margin erose, all shortly stalked. *sori* two to three on the smaller pinnules, roundish, or sublunate. Bermuda, 1879. Greenhouse or Wardian case species.

A. Capillus-Veneris (Venus's hair).* Common Maidenhair. *sti.* sub-erect, rather slender, 4in. to 9in. long. *fronds* very variable in size, with short terminal and numerous erecto-patent lateral branches on each side, the lowest slightly branched again; segments ½in. to 1in. broad, deeply lobed, and the lobes again bluntly crenated. *sori* placed in roundish sinuses of the crenation. Great Britain, and world-wide in its distribution. Greenhouse, case, or frame species.

A. C.-V. cornubiense (Cornish).* *fronds* very numerous, and dwarf, more or less oblong in general

outline, with large, broad pinnules of a deep green, with finely-waved margins, and an almost pellucid, but firm texture. One of the best forms, but somewhat delicate in constitution.

A. C.-V. crispulum (crisped).* *fronds*, with the stipes, from 6in. to 12in. long, more attenuated than those of the type, and narrower at the base; pinnules less numerous, but broad and thin, crisp, of a light green colour, more or less cut at the broadest part. A handsome variety, of vigorous growth.



FIG. 26. ADIANTUM CAPILLUS-VENERIS DAPHNITES.

A. C.-V. daphnites (glistening).* *sti.* and *rachises* dark brown, reaching a height of from 9in. to 14in. pinnæ and ultimate pinnules more or less confluent, the latter being broad, and of a dull green colour, usually forming a tufted crest at the extremities of the fronds. A charming subject for the Wardian case. Very distinct. See Fig. 26.

A. C.-V. fissum (divided). Very dwarf in habit, with pinnules rather broader than those of the type,

which are deeply and variously cut, so as to give the plant a distinctive appearance from most of the forms.

A. C.-V. Footi (Foot's). Closely allied to the variety *fissum*, having fronds a foot or more long, with very ample pinnules deeply incised, light green. Vigorous.

A. C.-V. incisum (deeply cut). Very closely allied to *A. C.-V. fissum*, but rather more vigorous in growth; pinnules broad, and deeply slit into segments near the base.

A. C.-V. magnificum (magnificent).* *fronds* from 9in. to 16in. long, more or less elongated in outline, 3in. to 4in. across; pinnules ample, rich green, with the margins finely cut and imbricated. The arching character gives this form a most distinct appearance. A very fine variety.

A. C.-V. rotundum (rounded). Pinnules usually round, without the cuneiform base of the normal form; neither are the fronds so broad. Isle of Man. Variable in its habit.

A. C.-V. undulatum (wavy).* *fronds* dense, compact, having broad, roundish dark green pinnules, which are undulated at the edges. An elegant dwarf-growing form.

A. cardiochlæna (heart-form indusium). A synonym of *A.*

polyphyllum.

A. caudatum (tailed).* *sti.* 2in. to 4in. long, tufted, wiry. *fronds* 6in. to 12in. long, simply pinnate, often elongated, and rooting at the extremity; pinnæ about ½in. long, ¼in. deep, dimidiate, nearly sessile, the lower line straight and horizontal, the upper rounded, more or less cut, the point usually blunt, the lower ones slightly stalked. *sori* roundish or transversely oblong on the edge of the lobes; *rachis* and both sides of the frond villose. *A. ciliatum* (of gardens) is probably a mere form, if not a synonym, of this species. Throughout the Tropics everywhere. Greenhouse or stove species; very fine for hanging baskets.

A. colpodes (deep hollow).* *sti.* 4in. to 6in. long, slender, slightly fibrillose. *fronds* 9in. to 18in. long, 4in. to 8in. broad, deltoid, tripinnate, light green; lower pinnæ spreading at right angles from the rachis, 2in. to 4in. long, 1½in. broad, slightly branched below; ultimate segments about ½in. long, ¼in. broad, the lower line often straight, the upper rounded, lobed, and toothed, all nearly or quite sessile. *sori* placed in distinct teeth of the outer edge. Ecuador and Peru, 1875. Greenhouse species.

A. concinnum (neat).* *sti.* 4in. to 8in. long. *fronds* 12in. to 18in. long, 6in. to 9in. broad, ovate-deltoid, tripinnate; pinnæ numerous, spreading, flexuous, the lowest 4in. to 6in. long, 2in. to 3in. broad; segments ¼in. to ⅜in. across, broadly cuneate at the base, the upper edge irregularly rounded, deeply lobed, the lobes crenate, the lowest segment of each pinna and pinnule large, sessile. *sori* numerous, ob-reniform. Tropical America. A most elegant species for baskets and the rockery.

A. c. Flemingi (Fleming's). This variety, of garden origin, is also very handsome.

A. c. latum (broad).* Differs from the type in being more erect and robust in habit, and broader in all its parts. It constitutes an excellent stove plant.

A. crenatum (crenated).* *sti.* 6in. to 9in. long. *fronds* with a terminal central pinna 6in. to 9in. long and several large erecto-patent lateral ones on each side, the lowest of which are branched again; segments about ½in. long, ¼in. deep, dimidiate, the lower line upcurved, the upper nearly straight, slightly crenate. *sori* numerous, round, placed on the upper and sometimes outer edge. This is closely allied to

A. tetraphyllum. Mexico. Stove species. SYN. *A. Wilesianum*.



FIG. 27. ADIANTUM DECORUM.

A. cristatum (crested). *sti.* 6in. to 12in. long, strong, erect, tomentose. *fronds* 1½ft. to 3ft. long, 9in. to 12in. broad, with a terminal central pinna 6in. to 9in. long, 1in. to 1½in. broad, and numerous rather distant lateral ones on each side, the lowest of which are sometimes again branched; segments ½in. to ¾in. long, ¼in. to ⅜in. broad, dimidiate, the lower line nearly straight, the

upper nearly parallel or rounded, the point blunt. *sori* in several oblong or linear patches. West Indies and Venezuela, 1844. Stove species. SYN. *A. Kunzeanum*.

A. cubense (Cuba).* *sti.* 4in. to 8in. long, nearly black, erect. *fronds* 6in. to 12in. long, 2in. to 4in. broad, simply pinnate, or with a single pair of short branches; pinnæ 1in. to 2in. long, and about ¾in. to 1in. broad, unilateral, the lower line slightly recurved, the upper rounded and broadly lobed, of a deep green colour, with a soft herbaceous texture. *sori* in hollows of the lobes. Cuba and Jamaica. A very distinct stove species.

A. cuneatum (wedge-shaped).* *sti.* 6in. to 9in. long, slender, erect. *fronds* 9in. to 18in. long, 6in. to 9in. broad, deltoid, tri- or quadripinnate; lower pinnæ 4in. to 6in. long, 2in. to 3in. broad; segments numerous, ¼in. to ⅜in. broad, cuneate at the base, the upper edge deeply lobed. *sori* four to six, obversely reniform. Brazil, 1820. This fine greenhouse species is more generally grown than any other; and a number of garden forms have received distinctive names.

A. c. dissectum (dissected).* A pretty variety, with the pinnules more deeply lobed than in the type.

A. c. Lawsonianum (Lawson's). This is a very abnormal form, curiously and finely cut, with the ultimate segments narrowly cuneate at the base, stalked, and distant. Of garden origin. Greenhouse variety.

A. c. mundulum (neat).* *sti.* 3in. to 4in. high. *fronds* dwarf, tufted, erect, hardly 3in. broad, deltoid, tripinnate; pinnæ and pinnules crowded; pinnules narrowly cuneate, rarely three-parted, with narrow wedge-shaped lobes; apex slightly crenate, and bears a roundish sorus set in a notch of the lobe or crenature. Of garden origin, 1879. Greenhouse variety.

A. Cunninghami (Cunningham's). Synonymous with *A. affine.*

A. curvatum (curved).* *sti.* 6in. to 12in. long. *fronds* dichotomous, with main divisions again once or twice forked; pinnæ 8in. to 12in. long, 2in. to 3in. broad; pinnules 1¼in. to 1½in. long, about ½in. deep, not truly dimidiate, but only the lower two-thirds of the under half cut away, the upper margin rounded and broadly lobed, with the lobes finely toothed and point often lengthened out. *sori* linear, or transversely oblong. Tropical America, 1841. Stove species.

A. decorum (decorous).* *sti.* 4in. to 6in. long. *fronds* sub-deltoid, 9in. to

15in. long, three to four pinnate; lower pinnæ and pinnules stalked, deltoid; side segments rhomboid, ¼in. to ⅜in. long; outer edge distinctly lobed; lower segments equilateral, imbricated over main rachis. *sori* round, in final lobes, four to six to a segment. This greenhouse species ranks midway between *A. concinnum* and *A. cuneatum*. Peru. SYN. *A. Wagneri*. See Fig. 27.

A. deltoideum (deltoid).* *sti.* densely tufted, 3in. to 4in. long, wiry, erect. *fronds* 4in. to 6in. long, ¾in. broad, with a terminal lobe and numerous sub-opposite pinnæ, the lower ones distant, distinctly stalked, ½in. long, ¼in. to ⅜in. broad, hastate-deltoid, cordate or cuneate at the base. *sori* in interrupted lines along the sides of the pinnæ. West Indian Islands. Stove species.



Fig. 28. Adiantum diaphanum.

A. diaphanum (transparent).* *sti.* 4in. to 8in. long, slender, erect. *fronds* 6in. to 7in. long, simply pinnate, or with one to three branches at the base; pinnules ½in. long, ¼in. broad, the lower line rather decurved, the upper nearly parallel with it, crenate like the blunt outer edge. *sori* obversely reniform, numerous. S.E. China, New Zealand, &c. Greenhouse species. Syn. *A. setulosum*. See Fig. 28.

A. digitatum (finger-leaved).* *sti.* 12in. to 18in. long, erect. *fronds* 1ft. to 3ft. long, 6in. to 1ft. 6in. broad, furnished with numerous distant spreading or erecto-patent branches, gradually shortened upwards, the lowest of which are branched again; lower pinnæ 6in. to 9in. long, 3in. to 4in. broad; segments ¾in. to 1in. each way, varying from deflexed to cuneate at the base, the upper edge rounded, deeply cut, and the lobes again less deeply cut, the lower ones distinctly stalked. *sori* in lines along the edge of the lobes. Peru. It is generally cultivated under the name of *A. speciosum*. Stove or greenhouse species.

A. dolabriforme (axe-shaped). Synonymous with *A. lunulatum*.

A. dolosum (deceiving). Synonymous with *A. Wilsoni*.

A. Edgworthii (Edgeworth's).* This differs from *caudatum* by having more membranous texture, glabrous surfaces, and sub-entire pinnæ. Himalaya and China.

A. emarginatum (notched at the end). Synonymous with *A. æthiopicum*.

A. excisum (bluntly cut).* *sti.* 2in. to 3in. long, wiry, densely tufted. *fronds* 6in. to 18in. long, 3in. to 6in. broad, with numerous flexuose short

pinnæ on each side, the lowest of which are slightly branched again; segments two to three lines broad, cuneate at the base, the upper edge rounded and bluntly lobed. *sori* two to four, large, obversely reniform, placed in distinct hollows on the lobes. Chili.

A. e. Leyi (Ley's).* This is a very dwarf, copiously crested form, of garden origin, most suitable for case culture. Greenhouse variety.

A. e. multifidum (much-cut).* A handsome garden variety; the apex of every frond is frequently divided into several branches, which oftentimes are again divided and crested, thus forming a beautiful tassel 2in. to 3in. long. Greenhouse species.

A. Feei (Fee's).* *sti.* 12in. to 18in. long, strong, scandent. *fronds* 1ft. to 2ft. long, 1ft. or more broad, tripinnate, the main and secondary rachises zigzag, all the branches firm and spreading at a right angle; lower pinnæ 6in. to 9in. long, 3in. to 4in. broad; pinnules 1in. to 2in. long, ½in. broad, consisting of a terminal segment and several distant suborbicular-cuneate lateral ones. *sori* marginal, roundish, more than half line deep. Tropical America. Stove species. SYN. *A. flexuosum*.

A. flabellulatum (small fan-

leaved).* *sti.* erect, strong. *fronds* dichotomously branched, and the divisions once or twice branched again; central pinnæ 4in. to 8in. long, ¾in. broad; pinnules about ¼in. broad and deep, dimidiate, the lower edge nearly straight, the upper rounded, the outer blunt, both entire or slightly toothed. *sori* in several transversely oblong notches. Tropical Asia. Stove species. SYN. *A. amœnum*.

A. flexuosum (zigzagly-bent). Synonymous with *A. Feei*.

A. formosum (beautiful).* *sti.* 12in. to 18in. long, strong, erect. *fronds* 18in. to 24in. long, 12in. to 18in. broad, bi-, tri-, or quadripinnate; lower pinnæ 12in. to 15in. long, 6in. to 9in. broad, deltoid; pinnules deltoid; ultimate segments ¼in. to ⅜in. broad, one and a half to two lines deep, dimidiate, the lower edge straight, the upper and outer rather rounded and deeply lobed, the lower ones distinctly stalked. *sori* numerous, between obreniform and transversely oblong. Australia, 1820. Greenhouse species.

A. fovearum. Synonymous with *A. intermedium*.

A. fulvum (tawny).* *sti.* 6in. to 9in. long, strong, erect. *fronds* 9in. to 12in. long, 6in. to 8in. broad, deltoid in general outline, with a terminal

pinna 4in. to 6in. long, about 1½in. broad, and several erecto-patent branches, the lower of which are branched again; pinnules about ¾in. long, ¼in. deep, dimidiate, the lower edge nearly straight, the upper almost parallel, sharply toothed like the oblique outer edge. *sori* large, numerous. New Zealand. Greenhouse species.

A. Ghiesbreghti (Ghiesbregh't's).* *fronds* 18in. to 30in. long, ovate, deltoid, tripinnate; pinnules large, slightly crenate on the margins. A very fine stove fern, with the habit of *A. tenerum Farleyense*, but less dense. It is undoubtedly a variety of *tenerum*, having originated in Mr. Williams's nursery some years since. SYN. *A. scutum*.

A. glaucophyllum (grey-leaved).* *sti.* 6in. to 9in. long, erect. *fronds* 12in. to 24in. long, 9in. to 15in. broad, deltoid, quadripinnate; lower pinnæ 6in. to 9in. long, 3in. to 6in. broad, deltoid, erecto-patent; segments ¼in. broad, cuneate at the base, the upper edge irregularly rounded, more or less lobed. *sori* four to six, obversely reniform, placed in distinct hollows in the apex of the lobes of the upper edge, deep green above, glaucous beneath. Closely allied to *A. cuneatum*. Mexico. Greenhouse. SYNS. *A.*

amabile, *A. andicolum*, *A. mexicanum*.

A. gracillimum (most graceful).* *fronds* deltoidly ovate, 9in. to 24in. long, and 6in. to 10in. across, decompound, rich green; ultimate pinnules distant, minute, distinctly stalked, obovate, emarginate, or two to three lobed, the sterile lobes blunt. *sori* solitary on the entire pinnules, two to three on the larger lobed ones. One of the most graceful and beautiful of greenhouse ferns; the very numerous minute segments and the ramifications of the rachis impart to a well grown plant a very charming appearance. Of garden origin. A form of *A. cuneatum*.

A. Henslovianum (Henslow's).* *sti.* 6in. to 12in. long, erect. *fronds* 12in. to 18in. long, 6in. to 9in. broad, ovate, tripinnate, furnished with numerous distant pinnæ on each side, the upper of which are simple, but the lowest slightly branched; segments ½in. to ¾in. broad, ¼in. to ⅜in. deep, dimidiate, the lower line nearly straight, the upper rather rounded and lobed, the point bluntly rounded. *sori* obversely reniform, placed in the hollows of the lobes. Columbia, Peru, &c., 1833. A most distinct and beautiful stove species. SYNS. *A. lætum*, *A. Reichenbachii*, *A. sessilifolium*.

A. Hewardia (Heward's). *sti.* 6in. to

9in. long, erect. *fronds* simply pinnate or bipinnate, with a terminal pinna and two to four lateral ones on each side, the lowest pair of which sometimes with two to four pinnules each; pinnules 3in. to 4in. long, about 1in. broad, nearly equal sided, ovate lanceolate, nearly entire. *sori* in continuous lines along both edges. Jamaica, &c., occurring over a wide area. Stove species. SYN. *Hewardia adiantoides*.

A. hispidulum (hairyish).* *sti.* 6in. to 15in. long, strong, erect. *fronds* dichotomous, with the main divisions flabellately branched; central pinnæ 6in. to 9in. long, ½in. to 1in. broad; pinnules ⅜in. to ¾in. long, two to four lines broad, dimidiate, subrhomboidal, the outer edge bluntly rounded, upper and outer margin finely toothed, slightly stalked. *sori* roundish, numerous, contiguous. Tropics of Old World, 1822. Greenhouse. SYN. *A. pubescens*.

A. intermedium (intermediate). *sti.* 6in. to 12in. long, erect, strong. *fronds* with a terminal pinna 6in. to 9in. long, 2in. to 3in. broad, and one to three small spreading lateral ones on each side; pinnules 1in. to 1½in. long; ¼in. to ½in. broad, unequal sided, but not dimidiate, the point bluntish or acute, the inner edge nearly parallel with the stem, the

upper nearly straight, scarcely toothed. *sori* in interrupted marginal patches, one to two lines across, placed round the upper and lower edges. Stove. Tropical America, from the Antilles southwards to Peru and Rio Janeiro, 1824. SYNS. *A. fovearum*, *A. triangulatum*.

A. Kunzeanum (Kunze's). Synonymous with *A. cristatum.*

A. lætum (joyful). Synonymous with *A. Henslovianum*.

A. Lathomi (Lathom's).* A garden variety, said to be a sport from *A. Ghiesbreghti*, which it closely resembles, being between it and *A. Farleyense*. It is a magnificent plant, producing *fronds* from 18in. to 24in. long, with imbricated deeply-cut pinnules. Stove variety.

A. Legrandi (Legrand's). Very closely allied to, if not identical with, *A. Pecottei*. Greenhouse variety, of garden origin.

A. Lindeni (Linden's).* *sti.* black, naked. *fronds* erect, large, pentagonal, tripinnate; rachises pubescent above, naked beneath; segments sub-distant, 1½in. long, oblong-rhomboidal, falcate, acuminate, outer margins closely but bluntly lobed, of a deep green colour, the lobes toothed. *sori* oblong or reniform. Amazons, 1866. A

magnificent stove species.

A. lucidum (shiny).* *sti.* 6in. to 9in. long, strong, erect. *fronds* 9in. to 15in. long, 4in. to 8in. broad, simply pinnate, with a large terminal pinna and six to ten lateral ones on each side, or the lowest very slightly branched, 3in. to 4in. long, ½in. to 1in. broad, nearly equal sided, lanceolate acuminate, slightly serrated towards the point. *sori* in a continuous row along each side. West Indian Islands and Tropical America. Stove species.



Fig. 29. Adiantum Luddemannianum.

A. Luddemannianum (Luddemann's).* A very striking variety of the common Maidenhair, *A. Capillus-Veneris*, of garden origin, with smooth, dark, almost black stipes, branching about a third of the way up, while the pinnules are crested, usually clustered, at the extremities of the branches, of a deep green, sub-glaucous character. It is a very elegant little greenhouse variety. See Fig. 29.

A. lunulatum (crescent-leaved).* *sti.* 4in. to 6in. long, tufted, wiry. *fronds* 6in. to 12in. long, 1in. to 2in. broad, simply pinnate; pinnæ ¾in. to 1in. broad, ½in. to 1in. deep, sub-dimidiate, the lower edge nearly in a line with the petiole, the upper edge rounded and, like the sides, usually more or less lobed. *sori* in continuous lines along the edge. Hongkong, &c., widely distributed in both hemispheres. Stove species. SYN. *A. dolabriforme*.

A. macrocladum (long-branched). Synonymous with *A. polyphyllum*.

A. macrophyllum (long-leaved).* *sti.* 6in. to 12in. long, strong, erect, nearly black. *fronds* 9in. to 15in. long, 4in. to 8in. broad, simply pinnate; the lower pinnæ of the barren frond 3in. to 4in. long, 2in. broad, ovate, so broad at the base that the opposite ones frequently

overlap, the margin rather deeply lobed; fertile ones narrower. *sori* in long continuous, or slightly interrupted, marginal lines. Tropical America, 1793. One of the finest stove species in cultivation.

A. macropterum (long-winged). Synonymous with *A. Wilsoni*.

A. mexicanum (Mexican). Synonymous with *A. glaucophyllum*.

A. microphyllum (short-leaved). A synonym of *A. venustum*.

A. monochlamys (one-covered).* *sti.* 6in. to 9in. long, wiry, erect, dark, chestnut brown; *fronds* 6in. to 12in. long, 4in. to 6in. broad, ovate-deltoid, tripinnate, the pinnæ rather distantly placed; segments ¼in. broad, cuneate at the base, the upper edge rounded, slightly toothed, of a light green colour, with a firm texture. *sori* single, or very rarely two, in a hollow of the upper edge. Japan. A very distinct and pretty greenhouse species.

A. monosorum (uni-soriate). A pretty species, from Solomon Islands, not yet in cultivation.

A. Moorei (Moore's).* *sti.* 6in. to 8in. long. *fronds* deltoid, 6in. to 15in. long, two to three pinnate; side segments about ½in. long, rhomboid, lower edge deflexed from tip of pedicel, outer lobed half way

down. *sori* round, placed in tip of lobes. Andes of Peru. Stove or greenhouse species. SYN. *A. amabile*, under which name it is frequently grown.

A. Moritzianum (Moritz's). This appears to be a stronger, more robust grower (fronds from 12in. to 18in. high), with thicker stipes and larger pinnules than the typical *A. Capillus-Veneris*. South America. Greenhouse species.

A. neoguineense (New Guinea).* *sti.* 6in. to 8in. long, chestnut brown, erect. *fronds* spreading, deltoid, tri-quadripinnate, dark olive green with a glaucous tinge on both surfaces; pinnæ ovate; terminal pinnules cuneate, lateral ones trapezoid, about ½in. long, crenately lobed, the lobes rather large, entire. *sori* small, 6in. to 8in., orbicular, entirely sunk in closed sinuses of the marginal lobes. New Guinea, 1877. A very charming stove species.

A. obliquum (oblique). *sti.* 3in. to 6in. long, erect, wiry, pubescent. *fronds* 6in. to 12in. long, 2in. to 4in. broad, with a terminal lobe and three to twelve pairs of alternate pinnæ, the lowest 1in. to 2in. long, ½in. to ¾in. broad, costate nearly to the apex, the upper half the largest, rounded at the base, the lower half obliquely truncate at the base, those

of the barren frond slightly toothed. *sori* in numerous interrupted marginal patches, one to two lines broad. West Indies, &c., 1826. Stove species.

A. palmatum (palmate).* *fronds* with elongated zigzag rachises, elongate-oblong, narrowed to the apex, tripinnate, often reaching 3½ft. long, 10in. broad; pinnules distinct; ultimate segments large, smooth, distant, distinctly stipitate, varying from obovate wedge-shaped to semi-orbicular in outline, but all deeply, palmately cut, 1in. to 1¾in. broad. *sori* oblong, variable in length, situate at the tips of the segments, usually one to each. This is a very beautiful and graceful stove or greenhouse species. Peru, 1877.

A. patens (spreading). *sti.* 6in. to 9in. long, erect. *fronds* dichotomously divided and the branches once or twice divided again; central pinnæ 6in. to 9in. long, 1½in. broad; pinnules ½in. to ¾in. long, ¼in. deep, dimidiate, the two sides nearly parallel, the upper and outer ones broadly and bluntly lobed. *sori* placed round the upper and outer edge, obversely reniform. Brazil, &c., 1824. Stove species.

A. Pecottei (Pecot's).* This is a charming little variety, of garden origin, with short decompound

fronds, imbricated segments, comparatively large, of a deep green colour, and likely to prove one of the most useful maidenhair ferns grown.

A. pedatum (pedate).* *sti.* 9in. to 24in. long, erect, polished. *fronds* dichotomous, with the main divisions flabellately branched; central pinnæ 6in. to 12in. long, 1in. to 1½in. broad; pinnules ½in. to ¾in. long, ¼in. deep, dimidiate, broadest on the side nearest the stem, the upper and outer margin lobed, shortly stalked. *sori* roundish, one to two lines broad. North Hindostan, the United States, &c. Hardy species. See Fig. 30.

A. peruvianum (Peruvian).* *sti.* 9in. to 18in. long, strong, erect. *fronds* simply pinnate, or with one to three branches at the base, some of the latter sometimes again slightly divided; pinnules 2in. or more broad, 1½in. deep, unequally ovate, cuneate at base, finely toothed and lobed round the upper and outer edge. *sori* in interrupted patches round the sides of the pinnules. Peru. This is one of the finest of the large growing, evergreen stove kinds.

A. polyphyllum (many-leaved).* *sti.* 12in. to 18in. long, strong, erect. *fronds* 2ft. to 3ft. long, 12in. to 18in. broad, the upper part simply

pinnate; lower pinnæ sometimes 1ft. long; 6in. broad, with a long terminal and numerous lateral pinnules; segments ¾in. to 1in. long, ¼in. deep, dimidiate, with nearly parallel edges, the point obtuse, the upper edge sharply toothed. *sori* in numerous sub-orbicular patches, placed in hollows in lobes along the upper edge. Columbia. A magnificent stove species. SYNS. *A. cardiochlæna* and *A. macrocladum*.

A. populifolium (poplar-leaved). A synonym of *A. Seemanni*.

A. princeps (princely).* *sti.* 9in. to 12in. long, stout, nearly erect. *fronds* large, 12in. to 24in. long, 9in. to 18in. across the base, deltoid, pendent, quadripinnate, pale greyish; lower pinnæ obliquely elongate, triangular, the posterior side tripinnate, the anterior bipinnate; upper ones pinnate, with a large cuneately flabellate terminal pinnule, apex of fronds pinnate; pinnules 1in. long, ¾in. broad, roundish rhomboidal or shortly trapeziform, shortly stalked; basal margin entire, slightly concave, the anterior margins and apex lobate, the lobes serrulate in the sterile parts, and, where fertile, bearing each a concave sorus, so that the lobes appear two-horned. New Grenada, 1875. A magnificent stove

species.

A. prionophyllum (saw-leaved). Synonymous with *A. tetraphyllum*.

A. pubescens (downy). Synonymous with *A. hispidulum*.

A. pulverulentum (covered with powder).* *sti.* 6in. to 12in. long, strong, erect; *fronds* with a terminal pinna and several spreading lateral ones on each side, which are 4in. to 8in. long, 1in. broad; pinnules ½in. long, one and a half to two lines deep, dimidiate, the lower line nearly straight, the upper one nearly parallel, both it and the outer edge finely toothed. *sori* in a continuous line along the lower and upper edges. West Indies, &c. Stove species.



FIG. 30. ADIANTUM PEDATUM.

A. Reichenbachii (Reichenbach's). Synonymous with *A. Henslovianum.*

A. reniforme (kidney-shaped).* *sti.* tufted, 4in. to 9in. long. *fronds* simple, orbicular, reniform, of a deep green colour, 1½in. to 2½in. across, with usually a broad, open sinus. *sori* all around the edge, one and a half to three lines broad. Madeira, &c., 1699. Greenhouse species.

A. r. asarifolium (asarum-leaved). A rather larger growing variety of

above species.

A. rhomboideum (rhomboid). S. America, 1820. Probably identical with *A. villosum*.

A. rubellum (reddish).* *sti.* 4in. to 6in. long. *fronds* 4in. to 6in. long, deltoid, bipinnate; uppermost side of the pinnules cuneate, flabellate, nearly sessile, entire; lower rhomboid ½in. long, with lower border in a line with petiole, or rather decurved, inner produced over rachis, outer deeply lobed and finely toothed; end and lowest pinnules deltoid, ½in. broad. *sori* round, placed in the tips of the lobes. This pretty species is purplish crimson when in a young state, changing to light green with age, but even then tinged with pink. Allied to *A. tinctum* and *A. decorum*. Bolivia, 1868. Greenhouse species.

A. scutum (shield). Synonymous with *A. Ghiesbreghti.*

A. Seemanni (Seemann's).* *sti.* 6in. to 12in. long, erect. *fronds* 9in. to 20in. long, simply pinnate or the lower pinnæ compound; pinnæ 3in. to 4in. long, 1½in. to 2in. broad, ovate, acuminate; but rather unequally sided, the barren ones finely serrated, one side usually cordate at the base, the other obliquely truncate, petioles of the lowest, nearly an inch long. *sori* in

long continuous marginal lines. This is a very fine and distinct stove species. Central America, 1868. SYNS. *A. populifolium*, *A. Zahnii* (of gardens).

A. sessilifolium (sessile-leaved). Synonymous with *A. Henslovianum.*

A. setulosum (bristly). Synonymous with *A. diaphanum*.

A. speciosum (showy). Synonymous with *A. digitatum*.

A. subvolubile (somewhat twining). *fronds* subscandent, 2ft. to 4ft. long, oblong, tripinnate, 6in. to 8in. broad, with naked glossy castaneous stipes and zigzag rachises; central pinnæ lanceolate, with a few short spreading pinnules; side pinnules rhomboidal, about ¼in. long, lower edge in a line with petiole, or deflexed, inner end touching or wrapped over rachis, outer shallowly lobed; lowest pinnules equilateral, much wrapped over rachis. *sori* minute, round, six to twelve to a segment. E. Peru. Stove species.

A. tenerum (tender).* *sti.* 1ft. or more high, erect. *fronds* 1ft. to 3ft. long, 9in. to 18in. broad, deltoid, tri- or quadripinnate; segments ½in. to ¾in. broad, cuneate or tending towards rhomboidal, dimidiate in shape, the upper edge rounder or somewhat angular, broadly and

deeply lobed, all stalked. *sori* placed in numerous roundish patches in the lobes of the upper half. Mexico, &c., widely distributed. Stove species.

A. t. Farleyense (Farley's).* A subfertile, subcristate variety of the foregoing; but, is, nevertheless, one of the most magnificent of Adiantums. It is nearly always known under the name of *A. Farleyense*. Barbados, 1865. Stove variety.

A. tetraphyllum (four-leaved).* *sti.* 6in. to 12in. long, strong, erect. *fronds* nearly as broad as long, with a terminal pinna 6in. to 9in. long, 1in. to 1½in. broad, and numerous spreading lateral ones; segments ½in. to ¾in. broad, ¼in. deep, subdimidiate, the lower line straight or somewhat decurved, the upper nearly parallel, finely toothed, the outer oblique. *sori* interrupted, marginal. Tropical America. Stove species. SYN. *A. prionophyllum*.

A. t. Hendersoni (Henderson's). A stove variety with small blunt pinnules.

A. tinctum (tinted).* *sti.* 6in. to 9in. long. *fronds* 6in. to 12in. long, deltoid, bipinnate; side pinnules rhomboid, three to four lines long, lower edge straight, inner parallel with rachis, or just wrapped over it, outer shallowly, bluntly lobed; lower

pinnules equilateral, imbricated over main rachis; surfaces glabrous, when young of a delicate rose red colour, changing to a bright green. *sori* round, placed in final lobes. Tropical America. Stove or greenhouse species.

A. trapeziforme (rhomb-leaved).* *sti.* 6in. to 12in. long, firm, erect. *fronds* 12in. to 24in. long, with a central pinna 4in. to 8in. long, 2in. to 3in. broad, and two to four large spreading ones on each side, the lowest of which are often branched again; segments 1½in. to 2in. long, ½in. to ¾in. broad, dimidiate, the sides nearly parallel, the outer edge oblique, both it and the upper one bluntly lobed, the lowest on stalks ¼in. to ½in. long. *sori* numerous, contiguous, placed round the upper and outer edge. West Indies, 1793. Stove species.

A. t. cultratum (sharpened).* Outer edge of the segment bluntly rounded.

A. t. pentadactylon (five-fingered). Lower margin of the segments somewhat decurved obliquely from the petiole.

A. t. Sanctæ Catherinæ (of gardens).* This is a deeply cut, rather copiously divided variety of *A. trapeziforme*.

A. t. S. C. Funcki (Funck's).* A deeply lobed, drooping variety, of garden origin.

A. triangulatum (triangle-leaved). Synonymous with *A. intermedium*.

A. varium (various). Probably identical with *A. villosum*.

A. Veitchianum (Veitch's).* *sti.* 6in. to 9in. long. *fronds* 9in. to 18in. long, deltoid, bipinnate in lower half, reddish when young; side pinnules rhomboid, about ½in. long, lower border straight, more or less deflexed from tip of pedicel, inner distant from rachis, upper and outer shallowly lobed; end segments ½in. to ¾in. broad, equilateral, rounded in upper, deltoid in lower half. *sori* eight to ten to a segment, round, minute. Peruvian Andes, 1868. A very elegant and distinct stove species.

A. velutinum (velvety).* *sti.* as long as fronds, slightly velvety. *fronds* deltoid, 1½ft. to 2ft. long, three to four pinnate; rachises densely pubescent on both sides; pinnæ 6in. to 9in. long; segments twenty to thirty-jugate, sub-sessile, sub-rhomboidal, 1in. long, ½in. broad, lower border decurved, outer blunt or sub-acute, upper straight, shallowly, bluntly lobed. *sori* straight, one to one and a half lines long at tips of lobes of upper edge,

four to six to a segment. Columbia, 1866. A magnificent stove species.

A. venustum (charming).* *sti.* 6in. to 9in. long, wiry, erect, glossy. *fronds* 6in. to 12in. long, 4in. to 8in. broad, deltoid, tri-quadripinnate; ultimate segments about ¼in. across, cuneate at the base, the upper edge rounded, and usually finely toothed, of a light green colour, with a firm texture. *sori* one to three, roundish; in hollows of the upper edge. Himalayas, up to 8000ft. Greenhouse or frame, nearly hardy in sheltered places. SYN. *A. microphyllum.*

A. villosum (hairy stalked).* *sti.* 9in. to 12in. long, strong, erect. *fronds* with a terminal central and several spreading pinnæ on each side, 6in. to 12in. long, 1½in. to 2in. broad; pinnules dimidiate, about 1in. long, ½in. broad, the lower line nearly straight, the upper edge nearly parallel with it, but considerably larger, slightly toothed, and the outer edge auriculed at the base. *sori* in a continuous line round the upper and outer edge. West Indies, &c., 1775. Stove species.

A. Wagneri (Wagner's). Synonymous with *A. decorum.*

A. Wilesianum (Wiles's). Synonymous with *A. crenatum.*

A. Williamsii (Williams's).* *sti.* 6in. to 8in. long. *fronds* 9in. to 18in. long, tripinnate, triangular; pinnæ ovate, distant, pinnules sub-rotund, slightly trapeziform, the basal line rather concave, the margin entire or slightly undulated, or divided into three to four lobes, crenately notched between the *sori*, the sterile portions with an erose diaphanous margin. *sori* eight to ten, elongate reniform or lunate, occupying the whole of the semicircular outer edge. Mountains of Peru, 1877. In a young state, the stipes and fronds are dusted with a yellow powder. This is one of the most beautiful of the Maidenhair ferns. Greenhouse species.

A. Wilsoni (Wilson's).* *sti.* 6in. to 12in. long, erect. *fronds* 9in. to 12in. long, 6in. to 12in. broad, simply pinnate, with a large terminal pinna and two to six sub-sessile lateral ones on each side, which are 4in. to 6in. long, 1in. to 2in. broad, ovate or ovate-lanceolate, acuminate, nearly entire. *sori* in continuous lines along both edges. Jamaica. Stove species. SYNS. *A. dolosum*, *A. macropterum*.

A. Zahnii (Zahn's). Synonymous with *A. Seemanni*.

ADIKE. A synonym of **Pilea** (which *see*).

ADINA (from *adinos*, crowded; in reference to the

flowers being disposed in heads). ORD. *Rubiaceæ*. A very pretty evergreen cool stove shrub, with opposite terete branches, and solitary, axillary peduncles. It thrives in a mixture of loam, sand, and peat. Propagated by cuttings, inserted in a rich, loamy soil, under a hand glass, in heat.

> **A. globifera** (globe-bearing).* *fl.* yellowish, sessile, crowded, collected into globose heads; corolla funnel-shaped; peduncles axillary, rarely terminal, solitary. July. *l.* lanceolate, glabrous, longer than the peduncles. *h.* 3ft. to 4ft. China, 1804.

ADLUMIA (from *adlumino*, to fringe with purple; flowers bordered with purple). ORD. *Fumariaceæ*. An interesting, delicate, and nearly hardy climber from North America. Flowers with four spongy, cohering petals. A warm, good soil is most suitable; sow seeds about May in a shady spot. It is a biennial, but in favourable spots is self-sowing, and thus may be treated as a perennial. If placed either against a wall or in the open it is a pretty subject for trailing over a shrub or twiggy branch. From its fragile character, it can only be seen to the best advantage under glass.

> **A. cirrhosa** (tendrilled).* *fl.* pale rose-coloured, about ½in. long; peduncles axillary, generally four-flowered. June. *l.* triply pinnate, pale green. *h.* 15ft. 1788. The Maidenhair fern-like leaves are borne in profusion on the slender twining stems. SYN. *Corydalis fungosa*.

ADNATE. Grown to anything by the whole surface;

anthers are said to be Adnate when they are attached to the filaments by their whole length.

ADONIS (name of classical derivation). ORD. *Ranunculaceæ*. Handsome hardy herbaceous plants. Flowers solitary, terminal; petals five to fifteen. Leaves divided into numerous linear segments. Some of the annuals are much inferior to the perennial species. The latter section constitute very ornamental subjects for rockwork, borders, margins of shrubberies, &c. All the species will grow freely in common soil, and are propagated by seeds. The perennials may be divided at the root.

A. æstivalis (summer).* Pheasant's Eye. *fl.* deep crimson; petals flat, oblong, obtuse, one-half longer than the calyx. June. Stem almost simple, elongated. *h.* 1ft. South Europe, 1629. Annual. See Figs. 31 and 32.

A. autumnalis (autumnal).* Pheasant's Eye; Red Morocco. *fl.* of an intense blood-red, with a black centre, rarely pale, globose from the six to eight concave conniving petals, which are scarcely larger than the calyx. May. Stems branched. *h.* 1ft. Britain. Annual.

A. pyrenaica (Pyrenean).* *fl.* almost sessile, yellow; petals eight to ten, smaller and more obtuse than in *A. vernalis*. July. *l.*, lower ones on long stalks, with trifid petioles and many-parted segments; upper ones sessile, multifid, with linear very entire lobules. Stem 1ft. or more high, and

usually much branched. Pyrenees, 1817. Perennial.



Fig. 31. Flower of Adonis æstivalis.

A. vernalis (spring).* *fl.* yellow, large; petals, ten to twelve, oblong, rather denticulated. March. *l.* lower ones abortive, or reduced to somewhat sheathing scales, the middle and upper ones sessile and multifid, with very entire lobes. *h.* 9in. to 1ft. Europe, 1629. Charming rock plant. This handsome species requires a rich moist sandy loam, and should not be disturbed for years. Perennial.



Fig. 32. Adonis æstivalis, showing Habit and Flowe

A. v. sibirica (Siberian) differs only in having larger flowers.

A. volgensis (Volga). An intermediate species between *A. vernalis* and *A. pyrenaica*, differing from the first in the stems being branched, leaves more distant; from the last by the lower leaves being abortive, and formed like scales; and from both in the sepals being pubescent on the outside, not smooth. *fl.* yellow. *h.* 1ft. Russia, 1818.

ADPRESSED. Brought into close contact with anything without adhering.

ADULT. The full grown of anything. Full grown leaves are termed adult.

ADVENTITIOUS. Developed in an unusual position. Applied to buds, roots, &c.

ADVENTURE BAY PINE. *See Phyllocladus rhomboidalis*.

ADVERSE. Opposite.

ÆCHMEA (from *aichme*, a point; in reference to the rigid points on the calyces, or flower-envelopes). Including *Pironneaua*. ORD. *Bromeliaceæ*. Very handsome stove plants. Flowers scapose, panicled; perianth six-cleft, three outer segments sepaloid, longer than the three inner or petaloid ones. Leaves ligulate or sword-shaped, sometimes with marginal spines. The species thrive best in a well-drained compost of rich fibrous loam and leaf mould. They like plenty of light, which may be afforded by standing them on inverted pots, so as to raise their heads well up above the surrounding plants. Propagation: When the flower-spikes, which are sent up from the heart or crown of the plant, die away, suckers or offsets are produced near the base, and from these other flowers appear the year after. If large plants are desired, these suckers should be left to grow and spread around; but to produce single plants, the suckers must be taken off and potted singly, in sharp soil, and then stood where they can get a moist heat till rooted. To enable them to do this it is necessary to strip off a few of the lower leaves, and trim the bottom with a sharp knife, in order that it may heal over and callus more readily than it otherwise would. When rooted, the plants may be

shifted into larger-sized pots; but for single crowns 32-sized pots are large enough, as the plants, being epiphytal in their nature, do not require much soil or any great supply of water, except when growing freely or sending up their flower-spikes. In winter, they should be kept rather on the dry side, to induce partial rest; and an important point is to see that water is not allowed to lie for any length of time in the crown of the plant, as when that is the case it is likely to cause them to rot.



FIG. 33. ÆCHMEA FULGENS.

Æ. calyculata (calycled).* *fl.* bright yellow, tubular, with red bracts, borne in close roundish heads at the top of an erect scape. *l.* strap-shaped, with the ends having the appearance of being cut off, but armed with a sharp spine. *h.* 9in. Brazil, 1862. SYN. *Hoplophytum calyculatum*.

Æ. cœlestis (heavenly blue).* *fl.* sky-blue, in close pyramidal panicles, on erect snipes. Winter. *l.* ligulate, concave, spiny-edged, scaly beneath. Brazil, 1874. SYN.

Hoplophytum cœleste.

Æ. cœrulescens (bluish). *fl.* bluish. *h.* 1ft. South America, 1870. This pretty species is very attractive on account of the large dense head of deep blue and pure white berries which are produced in October. SYN. *Lamprococcus cœrulescens*.

Æ. discolor (two-coloured-leaved).* *fl.* scarlet, borne on a loose, branched panicle. June. *l.* broad, minutely toothed on the margin, deep green above, and rather purplish beneath. *h.* 2ft. Brazil, 1844.

Æ. distichantha (two-ranked-flowered).* *fl.* sepals rose-coloured; petals bright purple; spikes densely clothed with bright red bracts. *l.* long, glaucous, linear-oblong, tapering to a sharp point, and distinctly armed with reddish brown spines. *h.* 1ft. South Brazil, 1852. SYN. *Billbergia polystachya*.

Æ. exudans (exuding). *fl.* orange-coloured (exuding a white greasy substance, whence the specific name) interspersed with green bracts; scape erect, with scattered crimson lanceolate bracts, terminating in a dense head. *l.* oblong, spine-margined, grey-coated. *h.* 2ft. West Indies, 1824. SYN. *Hohenbergia capitata*.

Æ. fasciata (banded).* *fl.* scape upright, clothed with leafy bracts of a rosy-pink colour; each of the pink blossoms in the dense conical head is subtended by a narrow, spiny-edged, similarly-coloured bract, longer than its own. *l.* broad, recurved, banded with white. Rio Janeiro, 1826. SYN. *Billbergia fasciata*. Lasts in perfection for a considerable length of time.

Æ. fulgens (glowing).* *fl.* deep rich red, with a bluish tip, fifty or more in a large branching panicle; scape stout, erect, scarlet. August, September. *l.* somewhat sword-shaped, terminating rather abruptly. Cayenne, 1842. See Fig. 33.

Æ. Furstenbergi (Furstenberg's). *fl.* rose; flower spike dense, with overlapping showy pink bracts. *l.* tufted, linear, spinous at the edge, recurved. *h.* 1ft. Bahia, 1879.

Æ. glomerata (glomerate).* *fl.* violet; scape erect, stout, 8in. to 10in. high, with glomerate branches of crowded blood-red bracts. *l.* oblong-ligulate, cuspidate, about 18in. long, dull green; margin with short wide-set spines. Bahia, 1868. SYN. *Hohenbergia erythrostachys*.

Æ. hystrix (bristly).* *fl.* in very dense, oblong spikes; floral leaves and bracts scarlet. February. *l.* densely crowded, ascending, linear

lanceolate, saw-toothed. *h.* 2½ft. Cayenne, 1880.

Æ. Legrelliana (Legrell's). A synonym of *Portea Legrelliana*.

Æ. Lindeni (Linden's). *fl.* yellow, in dense terminal heads, with lanceolate red bracts, shorter than the flowers. *l.* linear-oblong, rounded, apiculate; margins saw-toothed; habit tufted. *h.* 1ft. South Brazil, 1864.

Æ. Mariæ Reginæ (Queen Maria's).* *fl.* tipped with blue, changing to salmon colour with age, arranged compactly upon the upper portion of the spike; scape erect, about 2ft. high; half the length is clothed with large boat-shaped bracts, some 4in. long, intensely rich rose-pink. June, July. *l.* 18in. long, with a tufted habit. Costa Rica, 1873. This is perhaps the best species.

Æ. Melinoni (Melinon's). *fl.* bright scarlet, tipped with pink, cylindric; panicle dense, terminal. *l.* oblong, leathery, about 18in. in length, dark green; margin spiny. South America.

Æ. Ortgiesii (Ortgies'). *fl.* red, on short spikes. *l.* numerous, channelled, recurved, spongy, broad at the base, and tapering to a point; stem short, gouty. Tropical America, 1860. SYN. *Ortgiesia tillandsioides*.

***Æ.* paniculigera** (panicled). *fl.* rose-coloured; petals projecting beyond the sepals, deep bright purple; panicle large, compound, 1ft. to 2ft. long; scape reddish, downy; rachides and bracts rose-coloured. *l.* ligulate, shortly acuminate. West Indies, 1881.

***Æ.* spectabilis** (showy).* *fl.* rosy; calyx fleshy, ovate; corolla 1in. long, rosy crimson. *l.* spreading, channelled, ligulate, 2½ft. long, 3in. to 4in. broad. Guatemala, 1875.

***Æ.* Veitchii** (Veitch's).* *fl.* scarlet; spike densely clothed with scarlet toothed bracts, closely investing flowers. *l.* tufted, leathery in texture, broadly strap-shaped, spotted, and minutely serrulate. *h.* 1ft. Columbia, 1877. SYN. *Chevalliera Veitchii*.

ÆGICERAS (from *aix*, a goat, and *keras*, a horn; alluding to the shape of its fruit). ORD. *Myrsineæ*. Small trees, with obovate entire leaves. Flowers white, fragrant, in terminal or axillary umbels. For culture, *see* **Jacquinia**.

***Æ.* fragrans** (fragrant). *fl.* white, fragrant; umbels pedunculate, axillary, terminal. April. *l.* obovate, margin undulated, and unequally dilated, veiny; upper surface covered with saline excrescence. *h.* 6ft. New Holland, 1824.

ÆGILOPS. *See* **Quercus Ægilops**.

ÆGIPHILA (from *aix*, a goat, and *philos*, dear; a favourite with goats). ORD. *Verbenaceæ*. Stove ornamental evergreen shrubs, generally with ovate-lanceolate, acuminate, smooth leaves; and flowers in axillary and terminal panicles. They require a rich sandy loam. Propagated from cuttings, which will root in sand, under a glass, with bottom heat.

> **Æ. grandiflora** (large-flowered).* *fl.* yellow, terminal, corymbose; corolla downy. November. Berry compressed, blue. *l.* verticillate oblong, entire, sub-cordate at base. *h.* 3ft. Havannah, 1843. The other species are probably not now in cultivation, and this one is not generally so.

ÆGLE (from Ægle, one of the Hesperides). Bengal Quince. ORD. *Rutaceæ*. A stove evergreen tree, producing very large fruit, which much resembles an orange in general appearance, very delicious to the taste, and exquisitely fragrant. This genus differs principally from *Citrus* by its numerous disunited stamens. The pulp of the fruit is an aperient, and a valuable remedy in dysentery, the thick rind and the dried unripe fruit are astringent. It thrives best in a rich loamy soil. Propagated by ripe cuttings, which, if not deprived of any of their leaves, will root in sand under a hand glass, in heat.

> **Æ. Marmelos** (Marmelos). *fl.* white, very fragrant; panicles axillary, terminal. April. *fr.* fifteen-celled. *l.* trifoliate; leaflets toothletted. *h.* 10ft. India, 1759.

ÆOLANTHUS (from *aiollo*, to vary, and *anthos*, a flower; referring to the variableness of the flowers). ORD. *Labiatæ*. A genus of few herbs, with thickish leaves. Flowers loosely panicled. They thrive in sandy loam, and increase freely from seeds sown in a similar compost.

Æ. Livingstonii (Livingstone's). *fl.* brown. East Africa, 1859.

Æ. suaveolens (sweet-scented). *fl.* lilac, secund; cymes axillary and terminal, erect, usually trifid, with floral leaves under the divisions. July. *l.* nearly sessile, obovate, obsoletely denticulated, thickish, pale green. *h.* 1ft. Brazil, 1859. A pretty stove annual, with a sweet odour.

AERANTHUS (from *aer*, air, and *anthos*, a flower; referring to the habit). ORD. *Orchideæ*. A genus of a couple of species of remarkable stove orchids, requiring treatment similar to **Anguloa**, to which they are allied.

Æ. arachnitis (spider-like). *fl.* green. *l.* linear. *h.* 4in. Madagascar, 1850.

Æ. grandiflora (large-flowered).* *fl.* yellowish-green, large, solitary, terminal. *h.* 8in. Madagascar, 1823.

AERATION. The exposure of the soil to the free action of the air, as essential to the growth of plants.

AERIDES (from *aer*, the air; in reference to the power the species have of deriving their sustenance

from the atmosphere). ORD. *Orchideæ*. An extensive genus of epiphytal orchids, confined to the tropics of the Old World, including many large and showy-flowered species. The majority of them are extremely handsome. The thick fleshy leaves are noteworthy for their characteristically distichous arrangement—that is to say, they are arranged in two opposite rows. They are usually truncate at the apex, and for the most part deeply channelled down the centre, but in some species terete or nearly cylindrical. All of them throw out large fleshy roots from various parts of their stems, by which they absorb the moisture from the atmosphere; and, in order to grow them successfully, they must be fixed upon blocks of wood. But this method should be adopted only whilst the plants are young, as it is almost an impossibility for the cultivator to maintain a sufficient amount of atmospheric moisture to meet their requirements; and, unless this is managed, the leaves will shrivel and fall off, leaving only a few at the extremity. Therefore, as soon as the plants are established upon the blocks of wood, let them be removed and potted. Fill the pot three parts full of broken potsherds and lumps of charcoal, and then use nothing, but clean, living sphagnum, placing a few roots in the moss and leaving the others free. By this means a greater amount of moisture can be supplied to them, and thus beautiful and symmetrical specimens obtained. The Aerides are easily grown into handsome plants, which usually bloom profusely, and thus recommend themselves to all who cultivate orchids. From early spring until the end of September they should be treated liberally with water, at the same time taking care never to wet the flowers. After the above-named time, a gradual diminution in the water supply to the roots should take place; and the atmosphere, too,

should be less densely charged with moisture. But drought should never be carried far enough to cause the leaves to shrivel, for, if this is done, the uniformity of the specimen is marred; and, although we are quite willing to admit the possibility of the plants producing a greater quantity of flower spikes after a thorough shrivelling, we prefer to advocate the system that gives a fair amount of flower coupled with good leafage. As before remarked, the Aerides are peculiarly eastern, and therefore are usually classed amongst the orchids which require the hottest houses. This is, in one sense, correct; yet they do not require the great amount of heat which many imagine, and which has, until recently, been given them. They must not, therefore, be excluded from the amateur's collection of orchids. During the winter season many of the species may be kept in a temperature of 58deg. to 60deg.; whilst during the growing season the temperature may run up by sun heat without limit, so long as a free circulation of air and a sufficiency of moisture are secured. The following status of temperature may be observed: In spring, from 65deg. in the night, to 70deg. or 80deg. by day; in summer, from 70deg. in the night, to 80deg. or 85deg. through the day; in winter, about 60deg. night, and 65deg. day.

A. affine (related).* *fl.* delicate rose, produced, in great profusion, on branching spikes, which are sometimes 2ft. in length, and continue in bloom two or three weeks; the sepals and petals equal, rounded at the apex; the lip is sharply rhomboid and three-lobed, with a short spur. *l.* light green,

about 1ft. long. *h.* 3ft. A very handsome species from India, forming an excellent exhibition plant.

A. a. superbum (superb).* An improved variety, with larger and richer coloured flowers, and more compact habit.

A. Brookii (Sir A. Brooke's).* *fl.* purple and white; labellum bright purple; sepals and petals white, very fragrant. *l.* very ornamental, of a glaucous (milky green) hue. Bombay. This species, although one of the handsomest, is very rare.

A. crassifolium (thick-leaved).* This is a dwarf, densely-habited plant, with broad, thick, purple-dotted obliquely-bilobed leaves. The flowers, which are borne on long and drooping spikes, are bare—larger than those of *A. falcatum*, which they resemble in form, and have the segments tipped with rich purple or amethyst, the centre or throat of the flower being ivory-white. Compared with *A. falcatum*, the spur is here bent under at an angle, while in that plant it is straight; the side laciniæ of the lip are much broader and shorter in the present plant, and the two keels on the lip here stand close together at the base, and become divergent, whilst in *falcatum* they are distant at

the base, and become convergent near the middle of the lip. This species is described as being the best in the genus. It may be grown near the glass, suspended in a basket. Burmah, 1877.



FIG. 34. FLOWER OF AERIDES CRISPUM.

A. crispum (curled).* *fl.* white, suffused with purplish rose, nearly 2in. in diameter; sepals and petals ovate, acute; lip three-lobed, the middle lobe being very large, toothed at the base, and fringed at the margin; the horn-like spur is slightly incurved; racemes ascending, more than double the length of the leaves, many-flowered. *l.* deep green, flat and broad, blunt at the ends, and two-lobed, about 4in. or 5in. long. Bombay, 1840. Lasts a long time in beauty. See Fig. 34.

A. c. Lindleyanum (Lindley's). A robust-growing variety, producing a large, much-branched panicle of flowers; sepals and petals white; lip large, bright rich rose-coloured.

A. c. Warneri (Warner's).* The leaves are smaller, and more slender than in the species; the sepals and petals are white, with a soft, rich, rose-coloured lip.

A. cylindricum (cylindric).* *fl.* white and pink, as large as those of *A. crispum*; sepals and petals crispy. *l.* elongate, subulate, terete, 4in. to 6in. long. East Indies. A very rare and distinct species. SYN. *A. vandarum*.

A. dasycarpum (thick-fruited). *fl.* brownish, rosy. India, 1865.

A. dasypogon. *See* **Sarcanthus erinaceus**.

A. difforme (deformed). *fl.* green and brown. India, 1865.

A. Dominiana (Dominy's).* This is a garden hybrid between *A. Fieldingii* and *A. affine*, with the colour of the former, but markings and shape of the latter. Very rare.

A. falcatum (sickle-leaved).* *fl.* sepals and petals white, dotted with reddish crimson, and tipped with soft rose; lip white at the sides, with a rosy-crimson centre; spur short,

parallel with the lip; racemes pendulous, many flowered. *l.* closely set upon the stem, peculiar blue-green, coriaceous, obtuse and mucronate. This species is very closely allied to *A. crassifolium*. SYN. *A. Larpentæ*.



FIG. 35. AERIDES ODORATUM.

A. Fieldingii (Fielding's).* The Fox-brush Ærides. *fl.* white, numerous, large, beautifully mottled with

bright rose colour; the much branched racemes are 2ft. to 3ft. long, and continue blooming three or four weeks. *l.* 8in. to 10in. long, in some plants light green, and in others dark green; long, broad, thick, and fleshy, obliquely two-lobed at the apex. *h.* 3ft. to 4ft. Assam.

A. Houlletianum (Houllet's).* *fl.* sepals and petals buff, shading off into cream white at the base, with a purplish eye-spot at their tips; lip white; front part dark purplish, with some lines of the same colour on the sides; on densely crowded spikes. *l.* and growth similar to *A. virens*. Cochin China. SYN. *A. Mendelii*.

A. japonicum (Japanese).* *fl.* white, with the lateral sepals slightly barred with brown purple; several on the pendent racemes; lip purple, spotted, marked with a dark violet central ridge. *l.* short, linear-oblong, obtusely bilobed. Stems short, about 4in. high. A pretty cool house species from Japan, 1862.

A. Larpentæ (Lady Larpent's). Synonymous with *A. falcatum*.

A. Lobbii (Lobb's).* *fl.* white in the centre, slightly tinted with blush-rose towards the outside, somewhat spotted with violet; lip marked with a whitish central bar, and stained with a deep violet on either side; on long, dense, cylindrical, pendent

spikes. *l.* ligulate, obliquely two-lobed at the apex, thick and fleshy in texture, about 18in. long, and of a light green hue. Moulmein, 1868. This elegant plant, of which many distinct varieties are in cultivation, is one of the most delicate of the genus.

A. maculosum (spotted). *fl.* large, with obtuse pale rose-coloured sepals and petals, which are spotted with purple; lip flat and undivided, bluntly ovate, and of a deep rosy-purple; racemes pendulous, proceeding from among the upper leaves, somewhat lax and branching. *l.* ligulate, thick, and fleshy, obtuse at the apex, 8in. or 9in. long, dark green. A somewhat slow growing species, with a rather stiff, dwarf habit. Bombay, 1840.

A. m. Schrœderi (Schrœder's).* *fl.* very delicate white, tinged with lilac and spotted with rose; labellum beautiful rose coloured. *l.* dark green, 10in. long. *h.* 18in. East Indies. A very free growing and handsome variety, superior to the species, but rare in cultivation.

A. Mendelii (Mendel's). Synonymous with *A. Houlletianum.*

A. mitratum (mitred).* *fl.* waxy-white; lip violet coloured, on numerous dense erect racemes. April. *l.* cylindrical, attenuated,

about 2ft. long, dark green. Moulmein, 1864. A rare but elegant species.

A. nobile (noble).* *fl.* sepals and petals white tipped, and spotted with bright rose; lip three-lobed, the side lobes creamy yellow, and the middle lobe slightly bifid at the apex, white, dotted with rose-purple, very fragrant; racemes 2ft. to 3ft. long, pendulous, much branched, many flowered. *l.* strap-shaped, obliquely emarginate at the apex, light green, slightly spotted with brown. Not unlike *A. suavissimum*, but with larger and better coloured flowers, and more robust growth. East Indies.

A. odontochilum (tooth-lipped). *h.* 2ft. Sylhet, 1837.

A. odoratum (fragrant).* *fl.* sepals and petals creamy and white, tipped with pink; lip cucullate, with even side lobes, the middle lobe being ovate and inflexed, the spur conical and incurved, of the same colour as the sepals, very fragrant; racemes longer than the leaves, many-flowered, pendulous. *l.* oblique, obtuse, mucronate at the apex, and dark green. East Indies, 1800. See Fig. 35.

A. o. cornutum (horned). *fl.* pink and white. Distinct.

A. o. majus (greater).* Like *A. odoratum* in growth, but with larger and longer spike of flowers.

A. o. purpurascens (purplish).* A very robust variety, with broad dark green leaves and massive spike of large flowers, which are white, tipped with bright pink.

A. pachyphyllum (thick-leaved). *fl.* light crimson lake; spur and column white, the small laciniæ of the blade of the lip on front part of spur painted with more or less warm purple (these laciniæ are just as insignificant as the spur is preponderant); raceme short, few-flowered. *l.* fleshy, short; apex obtuse, and unequally two-lobed. Burmah, 1880.

A. quinquevulnerum (five-wounded).* *fl.* fragrant; sepals and petals obtuse, white, marked with five reddish crimson blotches, and tipped with purple; lip cucullate and funnel-shaped, the side lobes being erect and the centre lobe oblong, incurved and serrated, of the same colour as the sepals; spur conical, green, large; racemes longer than the leaves, pendulous, and many-flowered. Late summer and early autumn. *l.* ligulate, about 12in. long, tightly clasping the stem at the base, obliquely mucronate at the apex, bright shining green. Philippines,

1838.

A. q. Farmeri (Farmer's).* A very rare variety of the above, with similar habit, but the flowers are pure white throughout, and fragrant.

A. Reichenbachii (Reichenbach's).* *fl.*, sepals neatly striped (not blotched); lip deep orange colour; racemes densely crowded. Borneo, 1858. A very rare species.

A. roseum (rose-coloured).* *fl.*, sepals and petals narrow, acute, pale rose colour, with darker spots; lip flat, entire, and acute, of a bright rose, freckled—like the sepals and petals—with spots of a darker hue; raceme pendulous, dense, and many-flowered, upwards of 1ft. in length. *l.* coriaceous, recurved, and channelled above with a blunt two-lobed apex. Moulmein, 1840. As this does not root freely, it requires less moisture than any other species.

A. r. superbum (superb).* A fine variety, with stronger growth and larger and richer-coloured flowers. The spikes of this, as well as the typical species, are apt to die off if much water is given.

A. rubrum (red). A synonym of *Sarcanthus erinaceus*.

A. suavissimum (sweetest). *fl.* sepals and petals obtusely ovate, white, tipped or tinged throughout

with deep lilac; lip three-lobed, pressed to the column, the side lobes being oblong and denticulate, the middle lobe linear and bifid, the whole lip being of a pale lemon colour, and the spur rosy-eyed; the numerous racemes are half pendulous and branched, bearing a profusion of deliciously fragrant flowers. *l.* flaccid, about 10in. long, light green, profusely freckled with brown dots. Malacca, 1848. There are one or two varieties.

A. tesselatum (chequered). *fl.* lined and streaked with green, white, and purple. East Indies, 1838. A scarce species.

A. testaceum (testaceous). A synonym of *Vanda testacea*.

A. Thibautianum (Thibaut's). A synonym of *Saccolabium Huttoni*.

A. vandarum (Vanda). A synonym of *A. cylindricum*.

A. virens (vigorous). *fl.* deliciously fragrant; sepals and petals ovate, obtuse, soft white, tipped with rosy-purple; lip large; side lobes toothed at the apex, white, dotted with crimson; middle lobe bearing a red inflated tongue; racemes long, drooping, many-flowered, commencing to bloom early in April, and lasting until July. *l.* broad, oblique, rounded at the apex, with a

depression in the centre, and very bright green, about 8in. long.

A. v. Ellisii (Ellis's).* *fl.* sepals and petals large, white, suffused with rose, and tipped with amethyst; the lower sepals very round and broad; lip large; side lobes white, beautifully freckled towards the base, with short lines of amethyst; middle lobe broad, and deep rich amethyst in colour; spur stout, curved upwards, and tipped with brown; racemes about 18in. long, bearing generally from thirty to forty, or more, large flowers. *l.* pale green. A splendid variety.

A. Wightianum. *See* **Vanda testacea**.

A. Williamsii (Williams's).* *fl.* delicate pinkish white, produced in great abundance; spikes 2ft. to 3ft. long, and branched, *l.* broad, dark green, drooping. A very scarce and pretty species.

AEROBION. *See* **Angræcum.**

AEROPHYTES. Plants that are grown entirely in the air.

ÆSCHYNANTHUS (from *aischuno*, to be ashamed, and *anthos*, a flower). ORD. *Gesneraceæ*. A genus of very beautiful twining, radicant or parasitical stove shrubs, with opposite, simple, entire leaves, and axillary, terminal, few flowered, umbellate peduncles. They possess all the qualifications worthy

of extensive cultivation—handsome flowers, fine deep green leaves, an agreeable fragrance, and are easily grown on blocks, which must be covered with green moss, fastened on with small copper wire. Preparatory to fastening them on, the roots should be covered with moss, and the plants secured to the block also by wire. After this, but little attention is requisite, except duly syringing and occasionally dipping in tepid water. As pot plants they are very beautiful, and in this method perfection is only obtained by growing them on fast and strong by generous treatment, which consists in frequently repotting in light rich compost till they are large enough to be trained up a trellis, formed of slender rods of willow or hazel. Propagated by seeds and cuttings. The former are very unsatisfactory; the latter root readily during spring in a well-drained pot, filled with a light compost, and having a surface of pure white sand, about 1in. deep. The best are obtained from half-ripened wood, cut into 2in. or 3in. lengths, and all leaves, with the exception of one or two at the top, removed. The cuttings should then be covered over with a bell glass, and placed in moderate bottom heat. So soon as rooted, transfer them singly to small pots, and again place under hand glasses, until they are thoroughly established, then gradually harden off. When about twelve months old, place the plants in their permanent quarters. Baskets are commonly and very effectively employed. Line these with moss, and fill with a light rich compost; place the plant as near the centre as possible, and, to promote a uniform growth, fasten down the branches with small neat pegs, at equal distances. During the summer, give copious supplies of water, to produce a liberal growth, which is of the utmost importance the first season, when they should

not be permitted to flower. The following winter they should be kept cool and rather dry, thus giving them a rest. The year following, if properly managed, they will bloom profusely.

Æ. atrosanguinea (dark-red).* *fl.* dark red; corolla 1½in. long, cylindrical, saccate at base, pilose; peduncle one-flowered. July. *l.* pilose, oblong, sub-cordate, serrated, unequal. *h.* 1½ft. Guatemala, 1848.

Æ. Aucklandi. (Lord Auckland's). Synonymous with *Æ. speciosus*.

Æ. Boschianus (Bosch's).* *fl.* scarlet, axillary, clustered; corolla tubular, with wide throat; calyx tubular, smooth, purplish-brown. July. *l.* ovate, obtuse, entire. *h.* 1ft. Java, 1844. See Fig. 36.

Æ. cordifolius (heart-leaved).* *fl.* deep red, striped with black, inside of the tube orange, axillary, clustered. Summer. *l.* cordate, quite smooth, dark green on the upper side, paler below. *h.* 1ft. Borneo, 1858.

Æ. fulgens (shining).* *fl.* bright crimson, very long; throat and the under side of the tube orange; lobes striped with black, disposed in terminal umbels. October. *l.* large, oblong-lanceolate, acuminate, thick and fleshy, bright dark green. *h.* 1ft. East Indies, 1855.

Æ. grandiflorus (large-flowered).* *fl.* deep crimson and orange, large; corolla clavate; segments obtuse, with a dark mark at top, equal; umbels many-flowered. August. *l.* oblong-lanceolate, acuminated, serrated, obscurely-nerved, fleshy, dark green, *h.* 5ft. East Indies, 1838.

Æ. javanicus (Java). *fl.* bright red, stained with yellow in the throat; corolla downy, tubular; corymbs terminal, bracteate. June. *l.* small, ovate, slightly toothed, with sunk veins. Java, 1848. Plant scandent.

Æ. Lobbianus (Lobb's).* *fl.* rich scarlet; calyx large, campanulate; corolla downy; corymbs terminal, bracteate. June. *l.* elliptic, entire or slightly serrated, glaucous. Java, 1845. Plant subscandent.

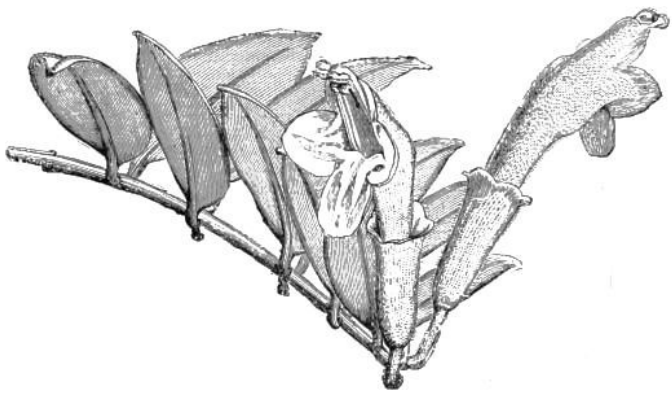


Fig. 36. *Æschynanthus Boschianus.*

Æ. longiflorus (long-flowered).* *fl.* scarlet, erect, fascicled; corolla with

a long clavate curved tube, and oblique constructed bilobed mouth; upper lobe bifid. Summer. *l.* broad-lanceolate, acuminate, entire. Java, 1845. Plant pendulous.

Æ. miniatus (vermilion).* *fl.* rich vermilion; corolla tomentose; upper lip bilobed, lower one tripartite; peduncles axillary, three-flowered. June. *l.* oval acute, entire. *h.* 1½ft. Java, 1845. SYN. *Æ. radicans*.

Æ. pulcher (fair).* *fl.* bright scarlet; corolla three times larger than the calyx; corymbs terminal, bracteate. June. *l.* ovate, obscurely toothed. Java, 1845. Scandent.

Æ. radicans (stem-fibred). Synonymous with *Æ. miniatus*.

Æ. speciosus (showy).* *fl.* rich orange-coloured; corolla with long clavate curved tube, and obliquely four-lobed limb; upper lobe bifid, terminal, numerous, downy. Summer. *l.* upper ones always verticillate, ovate-lanceolate, acuminate, slightly serrate. *h.* 2ft. Java, 1845. SYN. *Æ. Aucklandi*.

Æ. splendidus (splendid).* *fl.* bright scarlet, spotted with black on the margins; corolla clavate, 3in. long, in terminal fascicles. Summer, lasting in perfection for a considerable time. *l.* elliptic lanceolate, acuminated, entire,

rather undulated. *h.* 1ft. Hybrid.

Æ. tricolor (three-coloured).* *fl.* deep blood red, usually twin; throat and base of the lobes bright orange, the three upper lobes being striped with black. July. *l.* cordate, dark green above, paler on the under side; edges, under surface, and stem, slightly hairy. *h.* 1ft. Borneo, 1857.

Æ. zebrinus (zebra-marked). *fl.* green, brown. Autumn. Java, 1846.

ÆSCHYNOMENE (from *aischuno*, to be ashamed; in reference to the leaves of some of the species falling on the slightest touch, like those of the Sensitive plant). ORD. *Leguminosæ*. Stove herbs and shrubs, with impari-pinnate leaves, having many pairs of leaflets, and axillary racemes of usually yellow flowers. They thrive well in a good rich loam. Propagated by cuttings, placed in sand under a bell glass, in a brisk heat. Seeds of the herbaceous species require a good heat to start them into growth. The annuals are not worth growing. There are about forty other species known besides those mentioned, some of which may prove worthy of cultivation when introduced.

Æ. aristata (awned). A synonym of *Pictatia aristata*.

Æ. aspera (rough-stemmed). *fl.* yellow; racemes compound; peduncles, bracteas, calyces, and corollas, hispid. June. *l.* with thirty to forty pairs of linear leaflets, which (as well as the legumes) are smooth.

Stem herbaceous, erect. *h.* 6ft. to 8ft. East Indies, 1759. Perennial.

Æ. sensitiva (sensitive).* *fl.* white; legumes and racemes glabrous; peduncles branched, few-flowered. June. *l.* with sixteen to twenty pairs of linear leaflets. Stem smooth. *h.* 3ft. to 6ft. Jamaica, 1733. This shrub requires a sandy soil.

ÆSCULUS (a name given by Pliny to a kind of oak having an edible fruit; derived from *esca*, nourishment). The Horse Chestnut. ORD. *Sapindaceæ*. A genus of hardy showy trees, well adapted for lawns or parks, having a beautiful appearance when in flower. They will do well in any soil, but the more loamy the better. Increased by layers, put down in the spring, or by grafting or budding on the common horse chestnut. Seeds, where procurable, should be sown singly in rows in spring, where they may remain until they are of sufficient size to be permanently planted out. This genus is distinguished from *Pavia*, in having its capsules echinated, *i.e.*, covered with prickles, like a hedgehog; but this character is not always consistent.

Æ. carnea (flesh-coloured). Synonymous with *Æ. rubicunda*.

Æ. glabra (smooth-leaved).* *fl.* greenish yellow; corolla of four spreading petals, with their claws about the length of the calyx; stamens longer than the corolla. June. *l.* with five leaflets, very smooth; foliage larger than the common species. *h.* 20ft. North

America, 1821. SYNS. *A. ohioensis*, *A. pallida*.

***Æ.* Hippocastanum** (Common Horse-Chestnut). *fl.* white, tinged with red, on very handsome terminal racemes, which are produced in great profusion; petals five. April and May. *l.* with seven obovately-cuneated, acute, toothed leaflets. Asia, 1629. This, the common horse chestnut, is well known by the beautiful parabolic form in which it grows, and during the period of its flowering no tree possesses greater beauty. It has two or three unimportant varieties, differing in the variation of their leaves, and one also with double flowers. These are increased by grafting only.

***Æ.* ohioensis** (Ohio). A synonym of *A. glabra*.

***Æ.* pallida** (pale-flowered). A synonym of *A. glabra*.

***Æ.* rubicunda** (red-flowered).* *fl.* scarlet, in very fine terminal racemes; petals four, having the claws shorter than the calyx; stamens eight. June. *l.* with five to seven obovately-cuneated, acute, unequally serrated leaflets. *h.* 20ft. North America, 1820. This is a very distinct and beautiful tree when in flower, and does not attain so large a size as *Æ. Hippocastanum*. SYN. *Æ. carnea*.

ÆSTIVATION. The manner of the folding of the calyx and corolla in the flower bud.

ÆTHIONEMA (from *aitho*, to scorch, and *nema*, a filament; apparently in allusion to some tawny or burnt appearance in the stamens). ORD. *Cruciferæ*. A genus of elegant little plants, distinguished from allied genera in having the four larger stamens winged, and with a tooth. Herbs or sub-shrubs, perennial or annual, branched from the base, diffuse or erect. Flowers in crowded terminal racemes. Leaves fleshy, sessile. They are well worth cultivating in sunny situations, where they form a freer flowering habit than when growing in a wild state. Some of the more hardy species may be planted on rock work, which, by their dwarf growth, they are well adapted for. The annual and biennial species may either be sown on rockwork or in the front of the flower-border. A light dry soil suits them best. The shrubby kinds of this genus should be kept in pots, which should be well drained with potsherds, and treated like other alpine plants. Propagated by seeds, sown in May; or by cuttings, planted in summer.

> **Æ. Buxbaumii** (Bauxbaum's). *fl.* pale red; racemes crowded, aggregate. June. *l.* oblong-spathulate, glaucous. *h.* 6in. Thrace, 1823. A pretty annual, with erect branched stems. SYN. *Thlaspi arabicum*.



Fig. 37. *Æthionema coridifolium*, showing Habit and Flowers.

***Æ.* coridifolium** (Coris-leaved).* *fl.* rosy lilac, small, in terminal dense rounded racemes. June. *l.* linear, glaucous, crowded. Asia Minor, 1871. A pretty perennial, shrubby below, with erect stems 6in. to 8in. high. See Fig. 37.

***Æ.* gracile** (slender). *fl.* purplish; racemes crowded, terminal; when in fruit, loose. June. *l.* lanceolate, pointed. *h.* 8in. Branches and branchlets slender, elongated. Sandy hills in Carniola, 1820. Shrubby perennial.



Fig. 38. *Æthionema grandiflorum*, showing Habit and Flowers.

***Æ.* grandiflorum** (large-flowered).* *fl.* of a warm shaded rose; racemes crowded, terminal, numerous. May to August. *l.* ovate-oblong, glaucous. Mount Lebanon, 1879. This perennial species forms a spreading bush about 1½ft. high, and is perhaps the handsomest of the genus. It succeeds well in the ordinary border, but is far better suited for the rockery. See Fig. 38.

***Æ.* membranaceum** (membranous-

podded). *fl.* purplish, in terminal racemes. June. *l.* linear, distant, somewhat fleshy, strictly appressed. *h.* 3in. to 6in. Persia, 1828. A small shrub, with filiform branches.

***Æ.* monospermum** (one-seeded). *fl.* purple, largish, in terminal racemes. July. *l.* oval or obovate, blunt, coriaceous; pods one-celled, one-seeded. *h.* 3in. to 6in. Spain, 1778. A pretty little biennial, with hardish branches.

***Æ.* pulchellum** (pretty).* This is said to be a new species, but it much resembles *Æ. coridifolium*. It is scarcely in full cultivation yet, but it proves one of the hardiest as well as one of the most handsome kinds.

***Æ.* saxatilis** (rock).* *fl.* purplish; racemes loose, terminal. May and June. *l.* lanceolate, acutish. *h.* 8in. Spain, 1820. A pretty annual.

AFRICAN ALMOND. *See* **Brabejum.**

AFRICAN BLADDER NUT. *See* **Royena lucida**.

AFRICAN FLEABANE. *See* **Tarchonanthus**.

AFRICAN HAREBELL. *See* **Roella ciliata**.

AFRICAN LILY. *See* **Agapanthus.**

AFRICAN LOTUS. *See* **Zizyphus**.

AFRICAN MARIGOLD. *See* **Tagetes erecta**.

AFRICAN OAK OR TEAK. *See* **Vitex Doniana**.

AFRICAN SATIN-BUSH. *See* **Podalyria sericea**.

AFZELIA (named after Adam Afzelius, M.D., Professor of Botany in the University of Upsal, and for many years resident at Sierra Leone). ORD. *Leguminosæ*. A pretty stove evergreen tree. For culture, *see* **Ægiphila.**

> **A. africana** (African).* *fl.* crimson, disposed in racemes; petals four (furnished with claws), upper one largest. June. Legume ligneus, many-celled; seeds black, with scarlet aril. *l.* abruptly pinnate. *h.* 30ft. Sierra Leone, 1821.

AGALMYLA (from *agalma*, an ornament; and *hule*, a wood; the species are great ornaments to the woods in which they grow wild). ORD. *Gesneraceæ*. A small but very handsome genus of climbing or radicant herbs, with simple alternate leaves and axillary fascicles of flowers, something like the blooms of a Gesnera. Corolla limb oblique, five-lobed, scarcely two-lipped. *A. staminea*, the most generally cultivated species, is best grown in a basket, planted in a compost of rough peat, a little leaf soil, fresh sphagnum moss, and nodules of charcoal. Give an abundance of moisture when growing, which should be lessened after flowering, and allow the plant to rest during winter. It may be planted out on rockwork in the stove. Half-ripened cuttings will root freely in heat under a glass. The temperature in summer should not be less than 75deg. by day, and 65deg. by night.

> **A. longistyla** (long-styled). *fl.* crimson. Java, 1873.

A. staminea (long-stamened).* *fl.* scarlet, disposed in axillary fascicles; corolla tubular, incurved, with a dilated throat. Summer. *l.* alternate, oblong, acuminated, denticulated, nearly equal at the base, downy beneath, and on the edges. Stem and petioles hairy. *h.* 2ft. Java, 1846. Stove species.

AGANISIA (from *aganos*, desirable; in reference to the beauty of these neat little plants). ORD. *Orchidaceæ*. A small genus of epiphytal orchids, requiring to be grown upon a block of wood suspended from the rafters of the stove. A damp atmosphere, syringing the roots and leaves freely when in a growing state, and shade during very bright sunshine, are primary points to be observed in their cultivation. Increased by dividing the pseudo-bulbs just previous to starting into new growth.

A. cœrulea (dark blue).* *fl.* peduncles axillary, few flowered. "The colour is the well known one of *Vanda cœrulea*. There are, however, darker blue blotches quasi-tesselated over the flower. The lip is veiled, and has two very small basilar teeth, and then a veiled middle lacinia, that is sacciform, bordered with most remarkable long bristles, and with a deep violet blotch on its middle part beneath. The white column has two cartilaginous quadrate arms close to the stigmatic hollow." *l.* cuneate, oblong, acuminate. Pseudo-bulbs distichous,

depresso-ovoid. Brazil, 1876.

A. fimbriata (fringed).* *fl.* white; lip blue. Demerara, 1874. This species has also a sacciform, fimbriate lip, but, when compared with the foregoing, its flowers, leaves, and bulbs are much smaller, and the lip is not slit up to the apex, but the sac is round.

A. graminea (grass-leaved). A weedy looking species, of no garden value. Guiana, 1836.

A. ionoptera (violet-winged). The flowers, not very much larger than those of the lily of the valley, are white, with violet petals, and violet tips and streaks on the sepals. Peru, 1871.

A. pulchella (pretty).* *fl.* white, with a blotch of yellow in the centre of the lip; the spike is produced from the bottom of the bulb. *h.* 8in. Demerara, 1838. It blossoms at different times of the year, and lasts two or three weeks in perfection. This species is very rare and pretty, and is best grown in a pot, with peat, and good drainage; requires a liberal supply of water at the roots, and the hottest house.

AGANOSMA (from *aganos*, mild, and *osme*, a smell; scent of flowers). ORD. *Apocynaceæ*. A genus of showy stove or warm greenhouse shrubs, with opposite leaves and terminal corymbs of large

funnel-shaped flowers, the coronet of which is cup-shaped or cylindrical, "having its parts so united that they appear only as lobes around the mouth of the cup." All the species mentioned are well worth cultivating. They thrive best in a mixture of loam, sand, and peat, in equal proportions. Propagated by cuttings in sand, under glass, and with bottom heat.

A. acuminata (pointed-leaved).* *fl.* large, white, fragrant; petals linear, falcate, curled; panicles axillary, longer than the leaves, scattered. *l.* from oblong to broad-lanceolate, acuminated, glabrous. Sylhet. Shrubby climber.

A. caryophyllata (clove scented).* *fl.* pale yellow, tinged with red, deliciously clove scented; corymbs terminal. October. *l.* oval, acutish at both ends, tomentose beneath as well as the branches. India, 1812. Shrubby twiner.

A. cymosa (cymose-flowered).* *fl.* small, whitish, fragrant; calyx and corolla hoary outside; cymes terminal, shorter than the leaves. *l.* elliptic, acuminated. Sylhet. Shrub.

A. elegans (elegant).* *fl.* small, purple; corolla downy outside, as well as the calyces, bracteas, and pedicels; sepals longer than the tube of the corolla; corymbs terminal, crowded. *l.* elliptic, short-acuminated, glabrous. India. Shrubby twiner.

A. marginata (bordered).* *fl.* numerous, large, white, fragrant; petals linear, falcate; panicles terminal, loose, corymbose, glabrous. *l.* lanceolate, smooth. Sylhet. Shrubby climber.

A. Roxburghii (Roxburgh's).* *fl.* pure white, large, fragrant; calyx and corolla hoary outside; petals triangular; corymbs terminal. October. *l.* ovate-cordate, acuminated; petioles and veins red, glabrous, pale beneath, and shining above. India, 1812. Shrubby twiner.

A. Wallichii (Wallich's).* *fl.* white, fragrant; calyx and corolla downy outside; corymbs terminal. *l.* elliptic-acuminated, shining above and pale beneath, glabrous. India. This species differs from the last in the veins of the leaves being parallel, not longitudinal, from the base to the apex. Shrubby twiner.

AGAPANTHUS (from *agape*, love, and *anthos*, a flower). ORD. *Liliaceæ*. African Lily. A genus, with numerous varieties, of very handsome greenhouse or conservatory herbaceous plants. Flowers large, scapose; perianth tubular, tube short; stamens six, having the filaments somewhat declinate. Leaves linear or lorate, arching, radical. They are of easy culture, and thrive best in strong turfy loam, leaf mould, decomposed manure, and river sand. They may be grown in large pots or tubs outside, to be removed in autumn, and placed under the stage in the greenhouse, or where they will be protected from

frost, and kept moderately dry. If planted and left outside, the crowns should be well covered with cocoa-nut fibre in winter. During the summer, and especially in dry weather, the plants can hardly be over watered. They thrive admirably on the margins of lakes or running streams, and few plants, alike in flower and foliage, are more effective. Clear manure water may be given previous to or when the plants are in flower, and, after flowering, gradually lessen the quantity of water, until they are stowed away for the winter. They increase very rapidly, by offsets, and, if necessary, the old plants may be divided in early spring, to any extent required. In the more southern parts of this country they are quite hardy.



Fig. 39. Agapanthus umbellatus.

A. umbellatus (umbelled).* *fl.* bright blue; perianth funnel-shaped,

regular, deeply six-parted; tube short; scape tall, naked, bearing a many-flowered umbel. Summer and autumn. *l.* numerous, radical, linear, somewhat fleshy. *h.* 2ft. to 3ft. Cape of Good Hope, 1692. See Fig. 39.

A. u. albidus (whitish).* *fl.* pure white, on large full-sized umbels, smaller than those of the species, but very showy. Cape of Good Hope. This requires carefully drying off during the winter.

A. u. aureus (golden). A variety in which the leaves are marked longitudinally with yellow. 1882.

A. u. flore-pleno (double-flowered).* Identical in all respects with the species, except that it has double flowers, which are therefore, much more lasting than the single ones. A very handsome variety.

A. u. Leichtlinii (Leichtlin's).* *fl.*, perianth deep bright hyacinthine blue, 1¼in. long; scape about 1½ft. long, with a more compact umbel than any other known form. June. *l.* similar in size to the species. Cape of Good Hope, 1878.

A. u. maximus (larger).* *fl.* bright blue, in immense umbels. This is larger in all its parts than the type, and when well grown is truly a noble plant. There is also a white-flowered form of this variety, which

is most desirable, being equally as large.

A. u. minor (smaller).* This is smaller in all its parts, with narrow leaves, and slender scapes of deep blue flowers. A very elegant variety.

A. u. Mooreanus (Moore's).* *fl.* dark blue. *h.* 1½ft. 1879. A new variety, with shorter, narrower, and more upright leaves than the species; it has a dwarf habit. Perfectly hardy.

A. u. variegatus (variegated).* Where variegated-leaved plants are desired, few could be more useful than this; its leaves are almost entirely white, with a few green bands, but they are neither so broad nor so long as in the type. It is an excellent subject for the domestic garden.

AGAPETES (from *agapetos*, beloved; in reference to the showy character of the plants). ORD. *Vacciniaceæ*. A genus containing about eighteen species of warm greenhouse or stove evergreen shrubs. Flowers corymbose and racemose; corolla tubular. Leaves alternate, coriaceous. They are all worthy of cultivation, but only two or three species are grown in England. Peat, turfy loam, and sand, in equal parts, is the best compost for them; and young hardened cuttings will strike in sandy soil, under a hand glass, in stove temperature.

A. buxifolia (box-leaved).* *fl.* bright red, about 1in. long, tubular, wax-

like, disposed in corymbs. April. *l.* small, oval oblong, bright green, leathery; branches spreading, twiggy. *h.* 5ft. Bootan.

A. setigera (bristly). *fl.* red, about 1in. long, tubular, numerous, in lateral and corymbose racemes, furnished with bristly hairs. *l.* scattered, lanceolate, acuminated, on very short robust petioles. Pundua Mountains, 1837.

A. variegata (variegated). *fl.* scarlet, about 1in. long, tubular, lateral, corymbose. *l.* on short petioles, lanceolate, acuminated, denticulated, attenuated at the base, veiny. Khasia, 1837.

AGARICUS (derived from *Agaria*, the name of a town in Sarmentosa). Mushroom. ORD. *Fungi*. The most extensive genus known. It, however, contains but one or two species of cultural value. The most important ones are the common field mushroom, *A. campestris* (Fig. 44), the Fairy Ring mushroom, *A. pratensis*, and *A. vaginatus*. Familiar species are the Parasol mushroom, *A. procerus* (Fig. 43); St. George's mushroom, *A. gambosus* (Fig. 42); and the deadly Fly Agaric, *A. muscarius* (Fig. 41). For practical purposes the majority of this genus are poisonous, and many virulently so. Great care must be exercised in experimenting with unknown species, even by experienced fungologists. *See* **Mushroom**.

AGASTACHYS (from *agastos*, admirable, and *stachys*, a spike). ORD. *Proteaceæ*. A greenhouse evergreen shrub, with four sepalled apetalous flowers, which

are disposed in numerous spikes. It thrives in a compost of equal parts loam, sand, and peat. Cuttings of ripened wood will strike in sandy soil under a glass, in a cool house.

A. odorata (fragrant).* *fl.* pale yellow, sweet scented, crowded; spikes 4in. to 5in. long. April. *l.* bluntly lanceolate, sub-sessile, thickish, about 2in. long. *h.* about 3ft. New Holland, 1826.

AGATHÆA (from *agathos*, excellent; in reference to the beauty of the flowers). ORD. *Compositæ*. Allied to *Cineraria*, and requiring the same greenhouse treatment. It makes a very pretty object for summer decoration in the flower garden. Young cuttings root freely, in a gentle heat, at all times; and the plant may be had in bloom all the year round.

A. cœlestis (sky-blue).* *fl.-heads* blue; peduncle one-headed. June. *l.* opposite, ovate, naked. *h.* 1½ft. Cape of Good Hope, 1753. Herbaceous perennial. See Fig. 40.



FIG. 40. AGATHÆA CŒLESTIS.

AGATHA ROSE. *See* **Rosa gallica Agatha**.

AGATHIS. *See* **Dammara**.

AGATHOPHYLLUM (from *agathos*, pleasant, and *phyllon*, a leaf; referring to the pleasant clove-like smell of the leaf). Madagascar Nutmeg. ORD. *Lauraceæ*. A stove evergreen tree, of economic value only, having the fruit enclosed by the persistent calyx; thriving in peat and light rich loam. Of easy propagation by cuttings in sand, with a moderate bottom heat.

A. aromaticum (aromatic). *fl.* white. *l.* stalked, alternate, obovate,

obtuse, leathery, entire, smooth. *h.* 30ft. Madagascar, 1823.

AGATHOSMA (from *agathos*, pleasant, and *osme*, smell; the plants contained in this genus have a pleasant smell). SYNS. *Bucco*, *Dichosma*. ORD. *Rutaceæ*. Beautiful small heath-like greenhouse shrubs, from the Cape of Good Hope. Flowers in terminal heads, or umbels; petals five, divided, with long claws, and scattered, short, narrow leaves, usually with revolute edges. They are of easy culture, thriving best in a mixture of sand and peat, with the addition of a little turfy loam. Young cuttings will strike root freely in a pot of sand, under a bell glass, in a cool house. They require to be shaded somewhat in the summer. Winter temperature, 40deg. to 45deg. About forty-six species are known.

A. acuminata (taper-pointed leaved).* *fl.* violet; calyces smooth, glandular, on terminal subcapitate heads. April. *l.* ovate, somewhat cordate, long acuminated, fringed, at length spreading. *h.* 1ft. to 2ft. 1812.

A. bruniades (Brunia-like).* *fl.* lilac or white, on terminal sub-umbellate heads; peduncles fastigiate, elongated. April. *l.* scattered, linear-trigonal, awl-shaped, dotted, and a little fringed; branches hairy. *h.* 1ft. to 2ft. 1820.

A. cerefolia (chervil-leaved). *fl.* white, small; pedicels and calyces beset with glandular hairs; heads terminal sub-umbellate. April. *l.* crowded, lanceolate, acute,

spreading, keeled, fringed. *h.* 1ft. to 2ft. 1794.

A. ciliata (ciliated).* *fl.* white; pedicels smoothish; heads terminal sub-umbellate. April. *l.* scattered, lanceolate, acute, with toothletted-fringed, revolute edges, dotted beneath, and bearing hairs on the middle nerve, becoming at length reflexed. *h.* 1ft. to 2ft. 1774.

A. erecta (upright).* *fl.* pale violet, terminal, sub-umbellate; peduncles short, villous. April. *l.* imbricate, trigonal, blunt, dotted beneath, a little fringed. *h.* 1ft. to 2ft. 1818.

A. hirta (hairy). *fl.* purple, densely capitate; petals bearded at the claws. April. *l.* somewhat imbricate, linear, awl-shaped, channelled, hairy on the back, decurrent. *h.* 1ft. to 2ft. 1794.



Fig. 41. AGARICUS MUSCARIUS (Fly Agaric).



Fig. 43. AGARICUS PROCERUS (Parasol Mushroom).



Fig. 42. AGARICUS GAMBOSUS (St. George



Fig. 44. AGARICUS CAMPESTRIS (Comm

A. hispida (rough-haired). *fl.* violet, on terminal sub-umbellate heads; pedicels and sepals pubescent; petals quite smooth. May. *l.* crowded, linear, trigonal, blunt, spreading, hispid, keeled, and two-furrowed beneath. *h.* 1ft. to 2ft. 1786.

A. imbricata (imbricated). *fl.* pale purple, in terminal sub-capitate

heads; petals with a roundish limb; sepals smoothish; pedicels pubescent. April. *l.* imbricate, crowded, ovate, acuminated, dotted, fringed. *h.* 1ft. to 2ft. 1774.

A. orbicularis (round-leaved). *fl.* white, on terminal sub-umbellate heads; stamens twice as long as the corolla; pedicels pubescent. April. *l.* scattered, spreading, orbicular, ovate, or reniform, smooth, reflexed, small, thickish, without any dots beneath; branches villous. *h.* 1ft. to 2ft. 1790.

A. prolifera (proliferous). *fl.* white, on terminal sub-umbellate heads; sepals smooth; pedicels somewhat fastigiate, pubescent. April. *l.* spreading, lanceolate, cuspidate; keel and edges fringed, dotted; branches whorled, proliferous. *h.* 1ft. to 3ft. 1790.

A. pubescens (downy). *fl.* white; umbels terminal; peduncles and sepals villous. April. *l.* lanceolate, trigonal, pointless, with margins and rib ciliated. *h.* 1ft. to 2ft. 1798.

A. rugosa (coarsely-wrinkled). *fl.* white, on terminal sub-umbellate heads; sepals pubescent; pedicels capillary, clothed with glandular hairs. April. *l.* spreading, oblong or ovate, blunt, keeled, wrinkled, villous beneath, reflexed. *h.* 1ft. to 2ft. 1790.

A. vestita (clothed). *fl.* lilac, on terminal sub-capitate heads; pedicels quite smooth. May. *l.* closely imbricated, ovate, acuminated, keeled, fringed. *h.* 1ft. to 2ft. 1824.

AGATHYRSUS. *See* **Mulgedium**.

AGATI (its Sanscrit name). ORD. *Leguminosæ*. Ornamental stove trees from India, with lanceolate stipulas, abruptly-pinnate leaves, having many pairs of leaflets. Flowers large, few, racemose. Legumes 1½ft. long. A mixture of loam, peat, and sand is most suitable. Young cuttings will root in a pot of sand, with a hand glass over them, placed in heat.

A. coccinea (scarlet).* *fl.* red, rather smaller than the next species. Legumes rather terete. *l.* leaflets powdery. July. *h.* 20ft. to 30ft. 1768.

A. grandiflora (large-flowered). *fl.* rosy red. July. Legumes evidently compressed. *l.* leaflets glabrous. *h.* 14ft. to 26ft. 1768.

A. g. flore-albo (white flowered). *fl.* white, double. N. Australia, 1869.

AGAVE (from *agauos*, admirable; referring to the stately form in which some of them flower). ORD. *Amaryllidaceæ*. Flower-scape tall, proceeding from the centre of the rosette of leaves; perianth funnel-shaped, six-parted. Leaves large, fleshy, tufted. Mr. B. S. Williams describes them as follows: "They are noble, massive-growing plants, and form magnificent ornaments in the greenhouse or conservatory; whilst, from their slow growth, they do not rapidly get too

large, even for a small greenhouse. Indeed, some of the real gems of this genus are neat, compact-growing plants, seldom exceeding 2ft. in height. Besides being fine ornamental plants for indoor decoration, the larger growing kinds are unquestionably the finest objects for the embellishment of terrace-walks, or surmounting flights of steps in the open air during the summer season, and also for plunging in rockwork, or about any rustic nooks in the pleasure-grounds, as, in such situations, they are quite in keeping, and thrive admirably. As is well known, they attain maturity very slowly; but when this condition is reached, the plant sends up a flower spike, and, after perfecting this, dies." *A. Sartorii*, and a few others are, however, exceptional, and go on flowering year after year. It is certainly fallacious to suppose it takes them a hundred years to flower. Agaves succeed well potted in good loam and river sand, to which may be added a little peat and leaf mould for some of the smaller-growing kinds. The drainage should be good, as they enjoy a liberal supply of water during the summer season, but during winter considerably less will be required. They can be increased by suckers when these are to be obtained, and also by seeds, to secure the production of which, in the species that do not yield suckers, the flowers should be carefully impregnated. In the following descriptive list of species, only those of horticultural value are mentioned, some of which are still rare; and in describing them we have availed ourselves of Mr. J. G. Baker's excellent monograph, which appeared in the columns of the *Gardener's Chronicle*. Many are omitted, not from any deficiency in horticultural beauty, but because, in several instances, only one plant of a species is known to exist in cultivation,

and such cannot, therefore, hope to become in general cultivation for many years hence.

A. albicans (whitened). Probably a variety of *A. micrantha*.



Fig. 45. Agave americana.

A. americana (American).* *fl.* yellowish green, 2in. to 3½in. long;

in very dense globose clusters, on pedicels ¼in. to ½in. long; scape, including the thyrsoid panicle, 24ft. to 36ft. August. *l.* usually thirty to forty, sometimes more, in a rosette, oblanceolate-spathulate, 3ft. to 6ft. long, 6in. to 9in. broad above the middle, glaucous green, more or less concave all down the face, the outer leaves recurved, the dark brown pungent point 1in. to 2in. long; prickles brown tipped, 1/6in. to ¼in. long. S. America, 1640. See Fig. 45.

A. a. mexicana (Mexican). A variety much shorter in the leaves than the species, of which it may be regarded as one of the many small forms.

A. a. picta (painted).* *l.* 2ft. to 3ft. long, about 4in. wide, lower ones recurved, upper ones erect, moderately thick, rich golden yellow on both sides, bordered with dark green. A very splendid variety. SYN. *A. ornata*.

A. a. variegata (variegated). *l.* 6ft. or more in length, 6in. or 8in. wide, dark green in the centre, broadly margined with rich yellow. A very desirable variety.

A. amœna (pleasing). Referred to *A. Scolymus*.

A. amurensis (Amur River). Synonymous with *A. xylacantha*.

A. applanata (plano-convex-leaved). *fl.* unknown. *l.* twenty to forty in a dense sessile rosette, reaching a couple of feet in diameter, oblong-spathulate, 8in. to 12in. long, 2in. to 3½in. broad, the lower half of the face flat, the upper half concave, suddenly terminating in a pungent brown spine above 1in. long, blue-green bordered with brown; prickles ¼in. to ⅓in. long, bright brown. Mexico, 1869.

A. atrovirens (dark-green). Synonymous with *A. Salmiana*.

A. attenuata (attenuated).* *fl.* greenish-yellow, 2in. long; pedicels about ¼in. long, on a dense spike, 6ft. to 8ft. long, and 6in. in diameter; bracts overtopping the perianth. *l.* ten to twenty, in a dense rosette at the top of the stem, oblong-spathulate, 2ft. to 2½ft. long, 8in. to 9in. broad two-thirds of the way up, narrowed to 2½in. to 3in. above the base, persistently glaucous, one of the most fleshy of all in texture; face rather concave when young; tip not pungent, edge quite entire. Stem 4ft. to 7ft. high, 3in. to 4in. thick. Mexico, 1834. A most distinct species.

A. Beaucarnei (Beaucarne's). Synonymous with *A. Kerchovei*.

A. Botterii (Botteri's).* *fl.* greenish-

yellow, about 1in. long, on a dense spike, longer than the leaves; primary bracts lanceolate, with a long point, the lower ones as long as the flowers; scape covered with adpressed lanceolate bracts. *l.* about fifty in a rosette, oblong-spathulate, about 2ft. long, 6in. broad above the middle, narrowed to 4½in. above the base; pale green, concave in the centre; spine hard, pungent, about ½in. long; marginal teeth crowded, ⅛in., upcurved at the tip. Stemless. Mexico, about 1865.

A. bulbifera (bulb-bearing). Synonymous with *A. vivipara*.

A. cæspitosa (tufted). Synonymous with *A. Sartorii*.

A. cantula. Synonymous with *A. vivipara*.

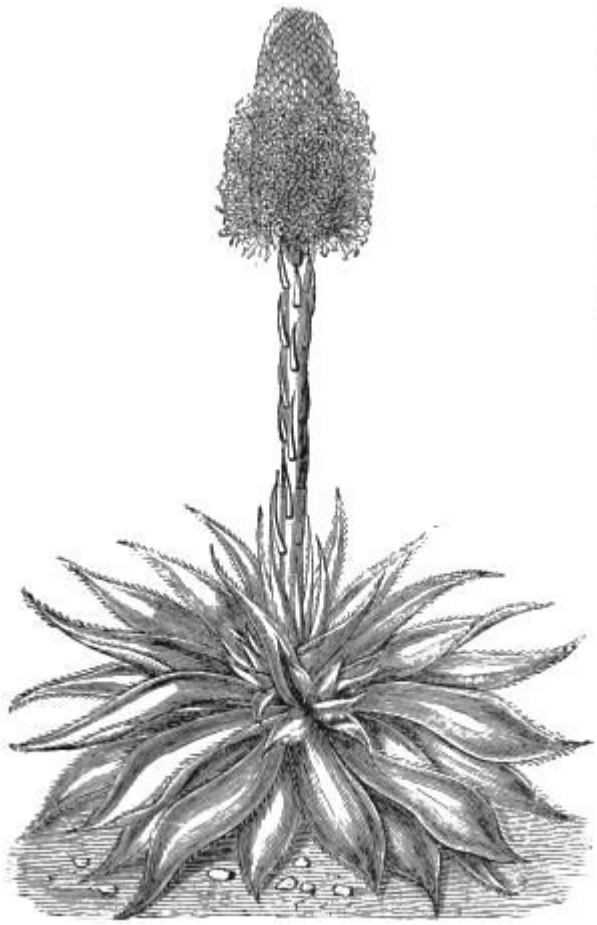


Fig. 46. Agave Celsiana.

A. Celsiana (Cels's).* *fl.* tinged purplish-brown, 2in. long, in a dense spike, 1ft. or more long, and 6in. to 8in. in diameter when expanded; scape 4ft. long, the lower bract leaves lanceolate, the upper ones subulate. *l.* twenty to thirty in a rosette, oblong-spathulate, 1½ft. to

2ft. long, 4in. to 5in. broad at the middle, narrowed to 2½in. to 3in. above the base, persistently glaucous, the point hardly at all pungent; spines very unequal in size and shape, green, largest brown and horny at the top. Mexico, 1839. This is a beautiful species, the stem of which scarcely rises off the surface of the ground. See Fig. 46.

A. coccinea (scarlet). *fl.* unknown. *l.* twenty to thirty in a dense rosette, oblanceolate-spathulate, 1½ft. to 2ft. long, 4in. to 6in. broad two-thirds of the way up, narrowed to 3in. above the dilated base, where it is 1in. to 1¼in. thick, deep heavy green; terminal spine 1½in. or more in length, red; side prickles irregular, deltoid, unequal, nearly straight, 1/6in. to ¼in. long, red. Mexico, 1859.

A. cochlearis (cochleate). *fl.* yellowish green, above 4in. long, in dense clusters. *l.* forming a sessile rosette 10ft. broad, oblong-spathulate, 5ft. to 6ft. long, above 1ft. broad, 5in. thick at the base, opaque green, with a deeply excavated face; terminal spine very stout, pungent; side prickles curved variously, middle sized, deltoid. Stems 26ft. high. Mexico, previous to 1867.

A. Consideranti (Considerant's).

Synonymous with *A. Victoriæ Regina*.

A. Corderoyi (Corderoy's).* *fl.* unknown. *l.* forty to fifty in a dense rosette, rigidly erecto-patent, ensiform, 1½ft. long, ¾in. to 1in. broad, bright green; terminal spine hard, brown, 1in. long; side prickles moderately close, erecto-patent, dark brown, 1/6in. long. Mexico, 1868. A very distinct and pretty species.

A. crenata (crenated). Referred to *A. Scolymus*.

A. cucullata (hooded). Referred to *A. Scolymus*.

A. dasylirioides (Dasylirion-like).* *fl.* yellow, about 1½in. long; spike as long as the scape, often decurved; lower bracts much longer than the flowers; pedicels obsolete; scape 6ft. long, densely clothed with spreading subulate bract leaves, the lower ones 1ft. long. *l.* eighty to a hundred in a dense rosette, linear-ensiform, 1½ft. to 3ft. long, about 1in. broad, narrowing gradually from the middle to a short brown pungent point, pale glaucous green, rigidly leathery; edge minutely denticulate. Mexico, 1846.

A. d. dealbata (whitened). A variety of preceding, but with more glaucous foliage.

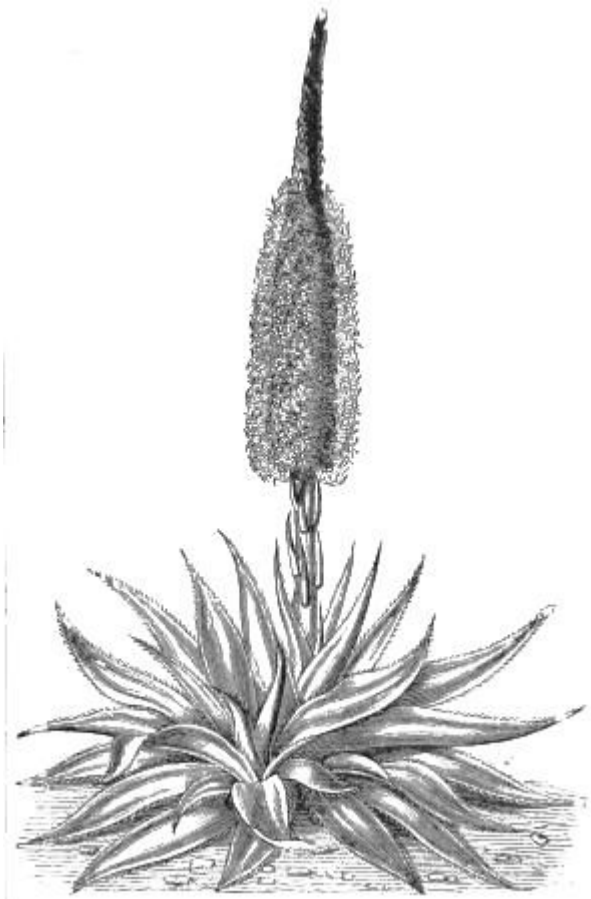


FIG. 47. AGAVE DENSIFLORA.

A. densiflora (close-flowered).* *fl.* yellowish-red, 1½in. to 2in. long, on a dense spike, 2ft. long; pedicels very short; scape, including the spike, 6ft. long, the lower bracts ascending, the upper ones spreading. *l.* thirty to forty in a stemless rosette, oblanceolate-spathulate, 2ft. to 3ft. long, and 2½in. to 5in. broad, bright

green when mature; terminal spine ½in. long, thick, pungent, slightly decurrent; side spines crowded, short, bright chestnut brown. Mexico (previous to) 1857. See Fig. 47.

A. Deserti (Desert's).* *fl.* yellow, under 2in. long, on a thyrsoid panicle, the branches very short, the lower horizontal, the upper ascending; pedicels short; scape 4ft. to 10ft. high, 1in. to 2in. thick at the base, furnished with distant lanceolate acuminate toothed bracts. *l.* few, in a rosette, oblanceolate, 6in. to 12in. long, 1½in. to 2in. broad above the middle, thick, fleshy, very glaucous; face deeply concave; terminal spine 1in. to 2in. long, slender; prickles crowded, strong, hooked, horny, nearly ¼in. long. California, 1877.

A. Desmetiana (De Smet's). Probably synonymous with *A. miradorensis*.

A. Elemeetiana (Elemeet's).* *fl.* yellowish-green, 1in. to 1½in. long, in a dense spike 8ft. to 9ft. long, 7in. to 8in. in diameter when expanded; pedicels ¼in. long; scape, including the spike, 12ft. to 13ft. high, stiffly erect, lower 3ft. to 4ft., barren, with squarrose lanceolate bracts. *l.* twenty to twenty-five in a rosette, lanceolate-oblong, 1½ft. to 2ft. long, 3in. to 6in. wide, slightly glaucous;

face flat above the middle terminal spine, not pungent, the margin pale and quite entire. Stemless. A very distinct species. Mexico, 1864.

A. Fenzliana (Fenzl's). Synonymous with *A. Hookeri*.

A. ferox (fierce). *fl.* unknown. *l.* about twenty in a rosette, oblong-spathulate, 4in. to 8in. broad; face nearly flat, except at the top, slightly glaucous green; terminal spine above 1in. long, hard, pungent; margin slightly wavy between the large dark brown teeth, which are about ¼in. long, and curved at the top. Mexico, 1861.

A. filifera (thread-bearing).* *fl.* greenish, about 2in. long; pedicels very short and stout, in a dense spike 2ft. to 3ft. long; scape 3ft. to 4ft. long, its bract-leaves subulate, the lower ones ascending, the upper squarrose. *l.* sixty to a hundred in a dense rosette, stiff, straight, ensiform, 6in. to 9in. long, 1in. broad at the middle, gradually narrowing to a grey pungent tip; face flat, the continuous grey edge splitting off copiously into irregular spreading grey wiry threads; outer leaves of the rosette not all recurved, but spreading stiffly. Mexico.

A. f. filamentosa (thready).* A form with larger leaves and scape; including the spike, 10ft. to 12ft.

high. A well-known, handsome variety.

A. Galeotti (Galeotti's). *fl.* unknown. *l.* thirty to forty in a dense rosette, 2ft. to 3ft. broad, oblong-spathulate, 1ft. to 1½ft. long, 2in. to 6in. broad; face rather flat or convex, green; terminal spine hard, pungent; prickles close, straight, or slightly hooked, purplish-black. Mexico, 1877.

A. Ghiesbreghtii (Ghiesbreght's). *fl.* unknown. *l.* thirty to forty in a dense rosette, rigid, lanceolate, 9in. to 12in. long, 2in. to 3in. broad, bright glossy green; terminal spine ½in. long, pungent; border narrow, red-brown till a late stage; side prickles numerous, irregular, two to three lines long. Mexico, 1862. Very handsome dwarf species. *A. Rohanii* and *A. Leguayana* are mere varieties.

A. heteracantha (various-spined).* *fl.* greenish, 1½in. long, on a dense spike 3ft. long; scape 3ft. to 4ft. long. *l.* fifty to eighty in a rosette, rigid, ensiform, 1½ft. to 2ft. long, 2in. to 2½in. broad in the middle, dull green, with numerous darker green lines on the back; terminal point 1in. long; side spines numerous, strongly hooked, lanceolate. Stemless. Mexico.

A. Hookeri (Hooker's).* *fl.* large, yellow, very numerous, in stalked

panicled cymes. *l.* thirty to forty in a sessile rosette, 8ft. or 9ft. in diameter, oblanceolate-spathulate, bright green on the face, rather glaucous on the back, 4ft. to 5ft. long, 5in. to 9in. broad, 2in. to 3in. thick; terminal spine 2in. long, and decurrent for nearly half a foot; face flattish or slightly concave; side prickles irregular, brown and horny, about ¼in. long, and curved in different directions. Mexico. SYN. *A. Fenzliana*. A rare and noble species, very massive.

A. horrida (horrid).* *fl.* unknown. *l.* thirty to forty in a dense rosette, rigid, lanceolate-spathulate, 8in. to 12in. long, 1in. to 2in. broad, bright green; terminal spine pungent, nearly 1in. long; margin furnished with a continuous broad grey border, with copious prickles ⅜in. to ½in. long.

A. h. Gilbeyi (Gilbey's).* *l.* about thirty, 3in. to 4in. long, 2in. broad, dark green with a pale stripe down the middle, three to four large spines on each side. Mexico, 1873.

A. h. lævior (smoother). *l.* somewhat narrower, longer, with marginal spines less strongly developed, and of a paler colour. Mexico, 1870.

A. h. macrodonta (long-toothed). *l.* fifty to sixty, 2½in. broad; spines

larger than in the typical form. Mexico, 1876.

A. h. micrantha (small-toothed). Border of leaf narrower, and spines smaller, than in the typical form.

A. Jacobiana (Jacob's). Synonymous with *A. Salmiana*.

A. Kerchovei (Kerchove's).* *fl.* unknown. *l.* thirty to forty in a stemless rosette, stiff, rigid, typically ensiform, 6in. to 12in. long, 1½in. to 2in. broad, narrowing gradually to a pungent spine 1in. long, dull green, with a distinct pale central band, rounded on the back, without any stripes of dark green, the margin with a continuous moderately broad grey border; side prickles irregular, grey, lanceolate, curved, ⅛in. to ¼in. long. SYN. *A. Beaucarnei*.

There are several varieties of *A. Kerchovei*, of which the following are the most important:—

A. K. diplacantha (double-spined).* With very few distant, small teeth, often collected or united in pairs.

A. K. inermis (unarmed). Dwarf, with spines entirely obsolete.

A. K. macrodonta (long-toothed). *l.* 1½ft. long, without any distinct central band, and with copious irregular grey lanceolate prickles, about ⅓in. long.

A. K. pectinata (comb-like). *l.* 1ft. long, 2¼in. broad, without any central band.

A. lophantha (crest-flowered).* *fl.* greenish, arranged in a dense spike 4ft. to 5ft. long; scape 7ft. to 8ft. long, its leaves brown, the lower ones 6in. long. *l.* thirty to forty in a rosette, rigid, ensiform, 2ft. to 3ft. long, 1½in. broad at the middle, rather concave down the face, rounded on the back, not marked with any lines, dull green; terminal spine 1in. long; margins bordered by a very narrow continuous grey hoary line, furnished with distant linear falcate teeth, about $^{1}/_{12}$in. long, sessile. Mexico.

A. l. cœrulescens (bluish).* *l.* with a decided glaucous bloom.

A. l. longifolia (long-leaved). A mere variety of above species.

A. macracantha (long-spined).* *fl.* greenish, 2in. long, ten to twelve in a loose raceme 6in. long, all solitary on ascending pedicels ¼in. to ½in. long; scape 2ft. to 3ft. long; bracts erect. *l.* thirty to fifty in a stiff rosette 1ft. to 2ft. broad, oblanceolate, 6in. to 12in. long, 1in. to 1½in. broad, very stiff and rigid, very glaucous; face rather thicker in the lower half; terminal spine nearly black, very pungent, ½in. long; side prickles purplish-black, sub-distant,

⅛in. long, with a large point straight or slightly hooked. With a short stem, or stemless. Mexico, 1830. It has many varieties, among which are *A. Bessereriana* and *A. flavescens*.

A. Maximiliana (Maximilian's).* *fl.* unknown. *l.* about twenty in a sessile rosette, oblanceolate-spathulate, 1½ft. to 2ft. long, 1¾in. to 3in. broad; face slightly glaucous green; terminal spine pungent, brown, 1in. broad; side prickles bright chestnut brown, larger and more irregular than in *A. americana*, more hooked, and furnished with longer and sharper points, reaching ¼in. long. Mexico. A very distinct species.

A. micracantha (small-spined). *fl.* yellowish, 1½in. long, in a dense spike 3ft. to 4ft. long, 6in. to 7in. broad when expanded. *l.* twenty to thirty in a shortly stalked rosette, oblanceolate oblong, 15in. to 18in. long, 3in. to 5in. broad above the middle, narrowed to 2in. to 3in. above the base, bright green; face flattish above the centre; terminal spine red brown, moderately firm; the copious close reddish-brown horny teeth about $^{1}/_{12}$in. long, the upper ones ascending, the lower deflexed. Mexico, 1860.

A. miradorensis (Mirador).* *fl.* unknown. *l.* about thirty in a sessile rosette, oblanceolate-spathulate,

1½ft. to 2ft. long, 2in. to 2½in. broad above the middle, thin but firm in texture, very glaucous, with a firm red-brown terminal spine 1in. long; side prickles very minute, crowded, colourless, five or six to an inch in the centre of the leaf. Mexico, 1869. SYN. (probably) *A. Desmetiana*.

A. Noackii (Noack's). A synonym of *A. Sartorii*.

A. ornata (adorned). A synonym of *A. americana picta*.

A. Ortgiesiana (Ortgies'). A dwarf form of *A. schidigera* with a pale central band to the leaf. Mexico, 1861. A widely-distributed and desirable species.

A. pendula (pendulous). Synonymous with *A. Sartorii*.

A. polyacantha (many-spined).* *fl.* greenish-yellow, 1½in. to 2in. long; flowering-stem 8ft. to 12ft. high, including the dense spike, which is 3ft. to 4ft. long. *l.* about thirty in a sessile rosette, oblanceolate-spathulate, rigid, 1ft. to 2ft. long, 2½in. to 5in. broad above the middle, bright green, slightly glaucous when young; terminal spine dark brown, pungent, ½in. to ¾in. long; side prickles crowded, deltoid, dark chestnut brown, irregular, $^{1}/_{12}$in. or ⅛in. long, all

sub-patent. Mexico, 1800. SYNS. *A. uncinata*, *A. xalapensis*.

A. Poselgerii (Poselger's). *fl.* purplish, rather more than 1in. long; scape, including the spike, 6ft. to 10ft. *l.* twenty to thirty in a dense rosette, rigid, ensiform, 1ft. to 1½ft. long; 1½in. to 2in. broad at the middle, dull green, with a broad pale band down to the face, rounded and marked with numerous distinct green lines down the back; margin furnished with a continuous straight, moderately broad edge; terminal spine 1in. long, brown, pungent; side prickles moderately close, lanceolate, hooked, 1/6in. long. Trunk, 4in. to 6in. long. Texas.

A. potatorum (drinkers'). *fl.* greenish yellow, 3in. long; scape 12ft. high, including the thyrsoid panicle, which is 4ft. to 5ft. long. *l.* about twenty in a dense sessile rosette, 4ft. to 5ft. broad, oblong-spathulate, 2ft. to 2½ft. long, 7in. to 9in. broad above the middle, a dull glaucous green; face slightly concave; terminal spines hard, pungent, 1½in. to 2in. long; side prickles deltoid-cuspidate, about ¼in. long, with the edge slightly wavy between them. Mexico, 1830.

A. pruinosa (frosty).* *fl.* unknown. *l.* ten to twenty in a dense rosette, spreading, oblanceolate-oblong,

1½ft. to 2ft. long, 4in. to 5in. broad above the middle, soft and fleshy in texture, pale glaucous green; terminal spine very weak; edge furnished with minute irregular spreading deltoid serrations, not more than quarter line long. Mexico, 1863. A very distinct species.

A. Roezliana (Roezl's). *fl.* unknown. *l.* twenty to thirty in a sessile rosette, stiff, ensiform, 6in. to 7in. long, 1in. to 1½in. broad at the middle, bright glossy green, with a distinct pale band down the centre, broadly rounded on the back, without any darker green lines, margined with a continuous moderately broad border, red brown at first, fading into grey when old; terminal spines bright reddish brown, pungent, ½in. to ¾in. long; side prickles copious, spreading, lanceolate, curved, ¼in. long. Mexico, 1869.



ACACIA LEPROSA (LEMON). A. LINEATA (ORANGE).

[See larger version]

A. Salmiana (Prince Salm-Dyck's).* *fl.* greenish yellow, 4in. long; panicle thyrsoid, 6ft. to 8ft. long, with erecto-patent branches and flowers in dense clusters; scape, exclusive of the panicle, 20ft. high. *l.* twelve to

thirty in a dense rosette, which is often 5ft. to 6ft. broad, oblanceolate-spathulate, 2ft. to 4ft. long, 4in. to 6in. broad above the middle, a dull, slightly glaucous green; face more or less concave; terminal spine 1½in. to 2in. long, hard and pungent; side prickles ¼in. long, chestnut brown, hooked up or down. Mexico, 1860. SYNS. *A. atrovirens*, *A. Jacobiana*, *A. tehuacensis*.

A. S. latissima (very broad). *l.* 2ft. to 3ft. long, by 8in. to 9in. broad above the middle.

A. Sartorii (Sartor's). *fl.* greenish, 1½in. long; pedicels very short, in a dense spike about 3ft. long, 5in. to 6in. broad when expanded; scape 3ft. to 4ft. long, the green linear ascending bracts 2in. to 4in. long. *l.* thirty to forty spaced out in a loose rosette, ensiform, 1½ft. to 2ft. long, 3in. broad at the middle, bright green, with a pale band down the middle; face flat; terminal spine small, not pungent; side prickles minute, crowded, spreading, tipped with red-brown. Caudex 1ft. to 2ft. long, sometimes forked. SYNS. *A. cæspitosa*, *A. Noackii*, *A. pendula*.

A. schidigera (spine-bearing).* *fl.* almost identical with *A. filifera*. *l.* fifty to eighty in a dense sessile rosette, stiff, ensiform, 12in. to 15in. long, ¾in. to 1in. broad at the

middle, similar in colour and texture to those of *A. filifera*, but the grey marginal border, and splitting off into flat shavings, not mere threads.

A. Schnittspahni (Schnittspahn's). Referred to *A. Scolymus*.

A. Scolymus (Scolymus). *fl.* greenish yellow, 2½in. to 3in. long; branches few, with the flowers at the end in very dense clusters; scape 14ft. to 16ft. high, including the thyrsoid panicle, which is 4ft. long and 2ft. broad, furnished with green bracts. *l.* twenty to thirty in a dense rosette 1½ft. to 3ft. broad, oblong-spathulate, 9in. to 18in. long, 3in. to 6in. broad above the middle, very glaucous, abruptly terminating in a pungent spine, 1in. or more long; side prickles chestnut brown, about ¼in. long; edge wavy between them; those on the lower half smaller and directed downwards. Mexico, 1830. Other so-called species referred to this are *A. amœna*, *A. crenata*, *A. cucullata*, *A. Schnittspahni*, and *A. Verschaffeltii*.

A. S. Saundersii (Saunders'). *fl.* about 1ft. long; teeth very large.

A. Seemanni (Seemann's).* *fl.* unknown. *l.* twenty in a sessile rosette, 1ft. to 1½ft. broad, oblong-spathulate, 6in. to 9in. long, 3in. to 3½in. broad at the middle, narrowed to 2in. above the dilated base,

slightly glaucous; face flat, except close to the top; terminal spine pungent, dark brown, ½in. long; side prickles large, moderately close, slightly curved upwards or downwards. Guatemala, 1868. There are two or three garden forms of this species.

A. Shawii (Shaw's).* *fl.* greenish yellow, 3in. to 3½in. long; panicle thyrsoid, about 2ft. long and broad; clusters dense, composed of thirty to forty flowers, surrounded by large foliaceous fleshy bracts. *l.* fifty to sixty, or more, forming a dense globose sessile rosette 2ft. in diameter, oblong-spathulate, 8in. to 10in. long, 3½in. to 4½in. broad at the middle, deep green; terminal spine brown, 1in. long, the upper third or quarter entire, the rest furnished with crowded upcurved lanceolate prickles, ¼in. to ½in. long. California, 1877. This species is very rare at present, but is a most distinct and handsome plant.

A. sobolifera (soboliferous). *fl.* greenish yellow, 2in. to 2½in. long, in a deltoid panicle, of which the lower panicles are 9in. to 12in. long, and bear a hundred flowers each; pedicels ¼in. to 1in. long; scape 8ft. to 10ft. high, 2½in. thick at the base. *l.* twenty to forty in a shortly caulescent rosette, oblanceolate-

oblong-spathulate, 2ft. to 3ft. long, 3in. to 5in. broad at the middle, very bright green; face deeply channelled, the border much raised and tip often recurved; terminal spine sub-pungent, chestnut brown, ½in. long; side prickles distant, brown, hooked, $^{1}/_{12}$in. to ⅛in. long. West Indies, 1678.

A. striata (striated-leaved).* *fl.* brownish green outside, yellow inside, 1in. to 1½in. long; pedicels very short; spike dense, 2ft. to 3ft. long; bracts linear, shorter than the flowers; scape 6ft. to 8ft. high, including the spike, furnished with numerous spreading subulate bracts, which are 2in. to 3in. long. *l.* 150 to 200 in a dense rosette, linear-ensiform, 2ft. to 2½ft. long, ¼in. to ⅜in. broad above the deltoid dilated base, where they are ¼in. thick and 1in. broad, narrowed gradually from the top of the base to the point, rigid in texture, glaucous green; face rather keeled, and the back more so; point brown, pungent, ½in. long; edges minutely serrulate. Mexico, 1856.

A. s. echinoides (Echinus-like). *l.* about 6in. long, ⅓in. broad at the middle; face flat. Mexico, 1869. Dwarfer and stiffer in habit than the variety *stricta*.

A. s. recurva (recurved-leaved). *l.*

longer than in the type, 3ft. to 4ft., more or less falcate, narrower, and decidedly convex on both surfaces.

A. s. stricta (upright). *l.* about 1ft. long, very stiff, ¼in. broad at the middle, both faces convex. *A. Richardsii* comes near to this variety.

A. tehuacensis (Tehuan). Synonymous with *A. Salmiana*.

A. uncinata (hooked). Synonymous with *A. polyacantha*.

A. univittata (one-striped).* *fl.* green, 1½in. long (or less); spike 10ft. to 12ft. long, 6in. to 7in. thick; pedicels ¼in. long; scape 4ft. long, exclusive of the spike, its bracts dense and squarrose. *l.* fifty to eighty in a stemless rosette, rigid, ensiform, 2ft. to 2½ft. long, 2in. to 3in. broad at the middle, narrowed slightly downwards, and very gradually upwards, dull green, with a broad pale band down the face, faintly lineate on the back; margin bordered by a narrow, continuous grey horny line, furnished with hooked lanceolate prickles, ⅛in. long, from ½in. to 1in. apart; terminal spine brown, pungent, 1in. long. Mexico, 1830.

A. utahensis (Utahan).* *fl.* yellowish, about 1in. long; peduncles ultimately ¼in. long; scapes, 5ft. to 7ft. high, including

the 1ft. to 2ft. spike. *l.* stemless, ensiform, 6in. to 12in. long, 1in. to nearly 2in. broad, thick, glaucous; terminal spine channelled, pungent, about 1in. long; marginal prickles, ⅛in. to ½in. long, white, with a darker base. Southern Utah, 1881. This is a true alpine species, perfectly hardy, and of very easy culture.

A. Vanderdonckii (Vanderdonck's). Synonymous with *A. xylacantha*.

A. variegata (variegated).* *fl.* greenish, about 1½in. long; spike about 1ft. long, fifteen to twenty flowered; bracts minute, deltoid; scape 2ft. long, exclusive of the spike, bearing about twelve lanceolate bract leaves. *l.* fifteen to eighteen in a sessile rosette, spreading, ligulate-lanceolate, finally 12in. to 15in. long, 1in. to 2in. broad below the middle, narrowed slightly downwards, and gradually to the point, deeply channelled down the face, and copiously spotted with brown on a green ground; edge hard and tough, very obscurely serrulate. Texas, 1865. This very desirable variegated species is extremely rare in cultivation.

A. Verschaffeltii (Verschaffelt's). Referred to *A. Scolymus*.

A. Victoriæ Regina (Queen Victoria).* *l.* forty to fifty in a sessile

rosette, stiff, rigid, lanceolate, 6in. long, 1½in. to nearly 2in. broad above the dilated base, narrowed gradually to a rather obtuse point, dead green, margined with a continuous white border, like that of *A. filifera*, not splitting up into threads, but leaving distinct white vertical bands where it is pressed against the neighbouring leaves; terminal spine ½in. long, black, pungent, with usually one or two small spines on each side of it. Mexico, 1875. This is also much too rare a plant. SYN. *A. Consideranti*.

A. virginica (Virginian).* *fl.* greenish yellow, 1in. to 1¼in. long; spike very loose, 1ft. to 1½ft. long; lower flowers with very short pedicels and lanceolate bracts, about ¼in. long; scape 2ft. to 3ft. high, exclusive of the spike, with only a few distant small bract leaves. *l.* ten to fifteen in a sessile rosette, spreading, lanceolate, 6in. to 12in. long, 1in. to 1½in. broad below the middle, narrowed gradually to the point and a little downwards; face channelled, undulated, pale green, or mottled with brown spots, the narrow hard and tough margin very obscurely serrulate. North America, 1765. *A. conduplicata* is said to be allied to this species.

A. vivipara (viviparous).* *fl.*

greenish yellow, 1½in. to 2in. long, often changed into bulbillæ, which bear lanceolate leaves 6in. long before they fall and take root; inflorescence reaching a height of 20ft. or more, the deltoid panicle about a quarter of the length of the scape; corymbs on stout peduncles, pedicels short. *l.* twenty to fifty in a dense, shortly caulescent rosette, ensiform, 2ft. to 3ft. long, 1½in. to 2in. broad at the middle, whence it gradually narrows to the point, dull green when mature, thin but firm in texture, flat or channelled down the face; terminal spine firm, brown, ½in. long; side teeth brown, hooked, $^{1}/_{12}$in. or less long. A very widely spread species throughout tropics of the Old World, 1731. SYNS. *A. cantula*, *A. bulbifera*.

A. Warelliana (Warell's).* *l.* about thirty in a rosette, oblong-spathulate, 9in. to. 10in. long, 3in. broad above the middle, narrowed to 2in. above the dilated base; face nearly flat, green, scarcely at all glaucous, tipped with a strong brown channelled spine 1in. long; border margined with close, very short teeth, dark purple when mature. Mexico. A rare but very handsome species.

A. Wislizeni (Wislizenius's). *fl.* 2½in. long; panicle thyrsoid, its

branches 3in. to 6in. long; pedicels very short; scape 12ft. high. *l.* about thirty in a dense, rigid, sessile rosette, which is under 2ft. broad, oblong-spathulate, 3in. to 3½in. broad above the middle, very glaucous, concave in the upper part; terminal spine hard, pungent, dark brown, 1in. long, and decurrent down the border a little; side prickles ⅛in. long, dark purple, moderately close, those below the middle of the leaf smaller and curved downward. Mexico, 1847.

A. xalapensis. Synonymous with *A. polyacantha*.

A. xylacantha (woody-spined).* *fl.* green, 1½in. long; spike dense, rather shorter than the scape, its bracts linear-subulate; scape 5ft. to 6ft. long, its bracts subulate, all ascending, the lower ones 6in. to 8in. long. *l.* not more than twenty in a stemless rosette, ensiform, diverging irregularly and often curving, 1½ft. to 3ft. long, 2in. to 3in. (rarely 4in.) broad at the middle, narrowed gradually upwards, a slightly glaucous dead green, marked with a few darker green lines on the back, furnished with a broad continuous horny border and a few very large irregular hooked teeth, often united or collected in pairs, ½in. to ¾in. long,

and ⅜in. to ½in. broad; terminal spine brown, pungent, 1in. long. Mexico. A long-known, widely-spread, and distinct species. SYNS. *A. amurensis* and *A. Vanderdonckii*.

A. x. hybrida is a striking dwarf variety with vittate leaves, and smaller, more crowded deltoid-cuspidate prickles than in the type. It is also commonly known as *A. x. vittata* and *A. perbella*.



Fig. 48. Agave yuccæfolia.

A. yuccæfolia (Yucca-leaved).* *fl.* greenish yellow, 1¼in. to 1½in. long, in a dense spike 6in. to 15in. long, about 14in. in diameter, sessile, solitary, or in pairs; scape 12ft. to 20ft. high. *l.* twenty to forty

in a dense, shortly-stemmed rosette, linear, much recurved, 1½ft. to 2½ft. long, ¾in. to 1in. broad at the middle; face deeply channelled, dull, rather glaucous green, with a pale band down the centre, the tip not at all pungent, the back broadly rounded, edge entire, or obscurely serrulate. Mexico, 1816. A most distinct species. See Fig. 48.

AGERATUM (from *a*, not, and *geras*, old; in reference to the flowers being always clear). SYN. *Cœlestina*. ORD. *Compositæ*. This genus includes several American species, for the most part half-hardy annuals and biennials; or, if the seed is not allowed to ripen, they become perennials. Involucre cup-shaped, of many imbricated linear bracts; receptacle naked. Leaves opposite. A light rich soil is most suitable. Very easily increased by cuttings or seeds; if required true, the former is the only sure method of propagation. To grow large plants for greenhouse decoration, sow the seeds in January, in heat, in sandy soil, barely covering them. As soon as the young plants are large enough, prick them off into thumb pots, and keep in heat till they grow freely, then place them into a cooler house. Transfer into larger pots as soon as the others are full of roots, until they are finally shifted into 10in. or 12in. pots. When these are full of roots, the plants should be watered with liquid manure twice a week, and they soon flower well, making fine specimens. During hot weather especially, they should be well syringed with clear water daily, to keep down red spider. The plants required for bedding (for which purpose the dwarf garden varieties are mostly used) should be

raised about the same time, kept in small pots, gradually hardened off, and planted out in the middle or end of June. Cuttings of all the varieties strike readily in heat, treated like most soft-wooded plants, and, when rooted, may be managed as recommended for the seedlings.

A. Lasseauxii (Lasseaux's). *fl.-heads* rose-coloured, small, disposed in corymbose heads. Summer. *l.* lanceolate-elliptic. *h.* 1½ft. to 2ft. Monte Video, 1870. A much-branched plant, requiring greenhouse protection in winter, and suitable for planting out in summer.

A. latifolium (broad-leaved). A synonym of *Piqueria latifolia*.

A. mexicanum (Mexican).* The commonest and most useful species, with a profusion of lilac-blue flowers. *h.* 2ft. Mexico, 1822. When used for bedding purposes it may be pegged down like the Verbena, or be allowed to grow its full height. Several very dwarf varieties of it have originated under cultivation, which supersede the species for bedding, the best of which are:—CUPID,* rich blue, very dwarf and floriferous; IMPERIAL DWARF, about 9in. high, with porcelain blue flowers; LADY JANE, of the same colour, very free; QUEEN,* silvery grey, about 9in. high; SNOWFLAKE,* white, very free and showy; SWANLEY BLUE,* very deep blue, 6in. to 8in.

high. There is also a white-flowered variety of *Mexicanum*, which is very showy; and a variegated form, sometimes grown for the sake of its pretty foliage.

AGGLOMERATE, AGGLOMERATED. Collected into a heap or head.

AGGLUTINATED. Glued together.

AGGREGATE, AGGREGATED. Gathered together; usually applied to the inflorescence.

AGLAIA. (mythological: from Aglaia, the name of one of the Graces, and given to this genus on account of its beauty and the sweet scent of the flowers). ORD. *Meliaceæ*. Stove evergreen trees or shrubs having very small flowers, disposed in branched axillary panicles. Leaves alternate, trifoliate, or impari-pinnate. There are several species, but the undermentioned is the only one worth growing yet introduced. It thrives well in a mixture of turfy loam and peat. Young cuttings ripened at the base, and taken off at a joint, will root in sand under a hand glass, in heat.

A. odorata (sweet-scented). *fl.* yellow, small, in axillary racemes, very sweet-scented, said to be used by the Chinese to scent their teas. February to May. *l.* pinnate, with five or seven glossy leaflets. *h.* 8ft. to 10ft. China, 1810.

AGLAOMORPHA. *See* **Polypodium**.

AGLAONEMA (from *aglaos*, bright, and *nema*, a thread; supposed to refer to the shining stamens).

ORD. *Aroideæ*. Stove perennials, allied to *Arum*, and requiring similar treatment to the stove species of that genus.

A. commutatum (changed).* *fl.* white. *l.* greyish-blotched. *h.* 1ft. Philippines, 1863. SYN. *A. marantæfolium maculatum*.

A. Mannii (Mann's).* *fl.*, spathe 2in. long, whitish, with a spadix one-third shorter, bearing white anthers and scarlet ovaries. *l.* elliptic-oblong, dark green. Stems thickish, erect. *h.* 1½ft. Victoria Mountains, 1868.

A. marantæfolium maculatum (Maranta-leaved, spotted). A synonym of *A. commutatum*.

A. pictum (painted).* *fl.*, spathe pale creamy yellow, folded round so as to appear globular-oblong, opening at top; spadix projecting, white. August. *l.* elliptic-acuminate, light green, blotched irregularly with broadish angulate patches of grey. Stems slender, erect. *h.* 1ft. to 2ft. Borneo.

AGNOSTUS. *See* **Stenocarpus**.

AGRAPHIS. Included under **Scilla** (which *see*).

AGRIMONIA (from *argos*, white; the cataract of the eye being white. Once reputed to contain medicinal qualities). Agrimony. ORD. *Rosaceæ*. A genus of hardy herbaceous perennials, with interruptedly pinnate leaves, each accompanied by a pair of stipules united

to the petioles. Flowers small, numerous, spiked; calyx turbinate, involucrated by bristles; petals five. They are all of the easiest culture, growing in ordinary soil. Readily increased by root-division. The most showy species in cultivation are described below.

A. Eupatoria (Eupatoria). *fl.* yellow, on an elongated spike. *l.* with elliptic-oblong, coarsely serrated leaflets, odd one stalked. *h.* 1ft. to 2ft. Britain.

A. nepalensis (Nepaul). *fl.* yellow, on erect, slender racemes. *l.* with ovate, serrated leaflets, odd one stalked, villous. *h.* 1ft. to 2ft. Nepaul, 1820.

A. odorata (sweet-scented).* *fl.* yellow; spikes several. *l.* with oblong lanceolate, deeply crenate-toothed leaflets, hairy. *h.* 2ft. to 3ft. Italy, 1640.

AGRIMONY. *See* **Agrimonia**.

AGRIOTES. *See* **Wireworm**.

AGROSTEMMA (from *agros*, a field, and *stemma*, a crown; alluding to the beauty of the flowers, which were formerly made into crowns or garlands). Rose Campion. ORD. *Caryophyllaceæ*. Hardy evergreen perennials and annuals, with broadish leaves, and one-flowered peduncles. Of easy culture, and well adapted for borders. They will all grow freely in common garden soil. Increased by division of the roots, and seed. *A. cœli-rosa*, and *A. flos-Jovis* are, perhaps, species of *Lychnis*, but the generic name

which we have adopted is the most common one. All the species of this genus are exceedingly pretty free-flowering plants, and both annuals and perennials are well worth growing.

A. cœli-rosa (rose of Heaven).* *fl.* delicate rose, white, or bright purple, solitary, terminal. Summer. Levant, &c., 1713. An annual species about 1ft. high, not tomentose; should be grown in patches. Sow the seed in April.



Fig. 49. Agrostemma cœli-rosa fimbriata.

A. c.-r. fimbriata (fimbriate). A form having fimbriated petals. Known also as *nana*. *h.* 9in. See Fig. 49.

A. c.-r. purpurea (purple).* A very pretty form, having dark purple flowers, and compact habit. See Fig. 50.

A. coronaria (crowned).* *fl.* white, with the middle red; petals emarginate, crowned, serrated; peduncles elongated, one-flowered. July. *l.* lanceolate, very broad, leathery; plant woolly throughout. *h.* 1ft. to 2ft. South Europe, 1596. This species is admirably adapted for naturalising on dry hill sides, and in the wild garden. There are several varieties seen in gardens with a great diversity of colour, including dark crimson, white, and sometimes double flowers. See Fig. 51.



Fig. 50. Agrostemma cœli-rosa purpurea.



Fig. 51. Agrostemma coronaria, showing Habit and Flower.

A. flos-Jovis.* Flower of Jove. *fl.* purple or scarlet, in umbellate heads; peduncles short, rather branched. July. *l.* lanceolate, stem-clasping, silky, tomentose. *h.* 1½ft. Switzerland, 1726. Plant white from tomentum. See Fig. 52.



Fig. 52. Agrostemma flos-Jovis, showing Habit and Flower.

AGROSTIS (from *agros*, a field; the Greek name for a kind of grass). Bent Grass. Ord. *Gramineæ*. Annual or perennial grasses. Panicle loose; spikelets compressed. Several of the species are very effective, and well worth growing; and the spikes are pretty objects, when dried, for window vases, &c. They are of easy culture, in ordinary garden soil. Sow seeds during spring in the open border, in tufts, among ferns, &c., or in pots for decorative purposes.

A. elegans (elegant). *h.* 1ft. Russia, 1834.

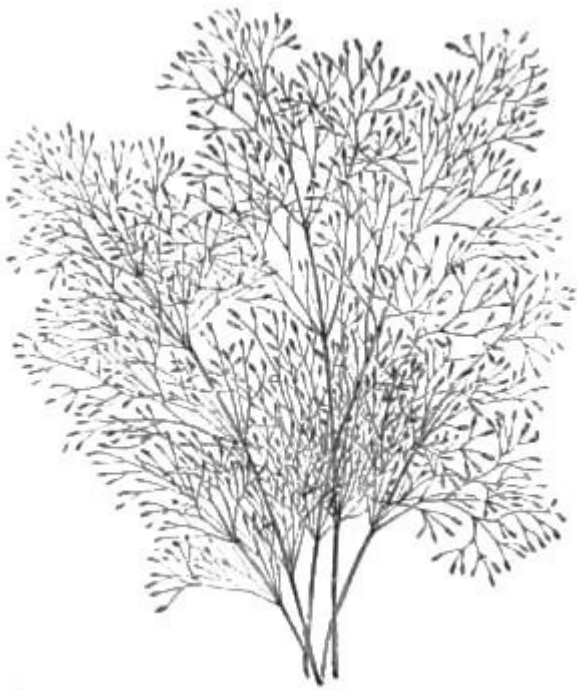


Fig. 53. Agrostis nebulosa.

A. nebulosa (cloud).* Cloud Grass.

fl. panicles resemble, when developed, a cloud resting over the ground. *h.* 1½ft. Very light and elegant. Annual. See Fig. 53.

A. pulchella (pretty).* Dwarfer, and with a more rigid habit than *A. nebulosa*. It is, nevertheless, a most graceful plant, and valuable for bouquet making, and for winter decorative purposes. *h.* 6in. to 12in. Russia. Annual.

A. spica-venti (windward-spiked). *fl.* panicle large, silky looking, loosely spreading. England. Annual.

AGROTIS. *See* **Pot-herb Moths** and **Turnip Moth**.

AILANTUS (from *ailanto*, referring to its lofty growth). Tree of Heaven. ORD. *Xanthoxylaceæ*. Tall deciduous trees. The stove species will grow freely in a mixture of loam and peat; and the best way to increase these is by pieces of the roots, planted in a pot with their points above the ground, and placed in a hotbed, where they will soon make fine plants.

A. excelsa (tall). *fl.* whitish green, disposed similar to the following. *l.* abruptly pinnate, 3ft. long, with ten to fourteen pairs of leaflets coarsely toothed at the base, without glands. *h.* 66ft. India, 1800. A stove tree.

A. glandulosa (glandulous).* *fl.* whitish green, disposed in large branched, terminal, fascicled panicles, exhaling a disagreeable smell. August. *l.* impari-pinnate;

leaflets coarsely toothed at the base with glands. (The leaves on vigorous young trees are sometimes 6ft. in length.) *h.* 60ft. China, 1751. This tree grows with great rapidity for the first ten or twelve years, in favourable situations, afterwards its growth is much slower. It is quite hardy, and thrives in almost any soil, though one that is light and somewhat humid, and a sheltered situation, suits it best. It is a very desirable tree for plantations, or to stand singly on lawns, and is easily increased by slips of the roots.

AINSLÆA (in honour of Dr. Whitelaw Ainslie, author of a work on Indian drugs). ORD. *Compositæ*. Herbaceous perennials, of recent introduction. Although, no doubt, both species will prove tolerably hardy, they should have slight protection during winter. They thrive in light rich soil. Propagated by divisions of the root.

A. aptera (wingless). *fl.-head* purple, disposed in an elongated spike-like panicle. *l.* deeply cordate, sinuately toothed; petioles wingless, whence the name. Sikkim Himalayas, 1882.

A. Walkeræ (Mrs. Walker's).* *fl.-heads* slender, distant, shortly stalked, borne in erect or somewhat nodding racemes; the white corolla-lobes and the red purple anthers make a pretty contrast. *h.* about 1ft. Hong Kong, 1875. A very rare and

graceful species.

AIR. Pure atmospheric air is composed of nitrogen, oxygen, and a very small quantity of carbonic acid gas, all of which are essential to the growth of plants. Air-giving is a term used by gardeners to lessen the temperature of a greenhouse, or to equalise it with that outside. *See* **Ventilation**.

AIRA (from *aira*, applied by the Greeks to *Lolium temulentum*). Hair Grass. ORD. *Gramineæ*. Chiefly hardy grasses, of agricultural value. Panicle loose; spikelet compressed, with two perfect flowers, and sometimes a neuter. Of easy culture, in ordinary garden soil. Sow seeds in spring.

A. flexuosa (waved).* The Waved Hair Grass. *fl.* shining brown; panicle erect, spreading, with waved angular branches and flower-stalks. *l.* short. Stem upwards of 1ft. high, erect, smooth. England. A very pretty and graceful perennial.

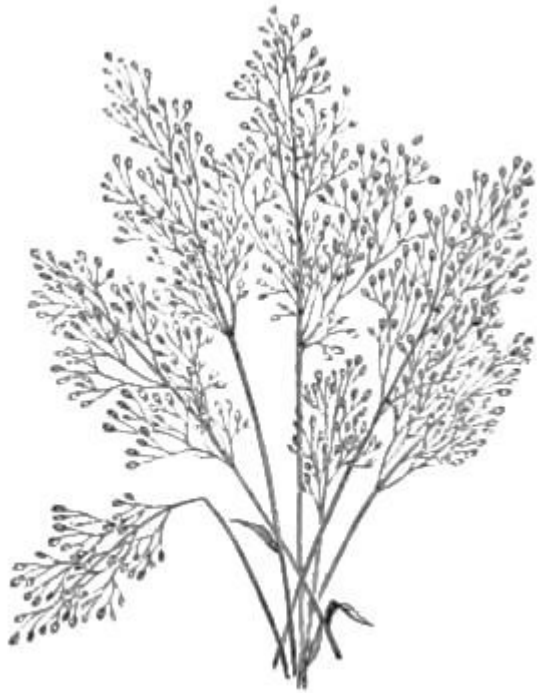


FIG. 54. AIRA PULCHELLA.

A. pulchella (pretty).* *fl.* panicles loose, very delicate and graceful. *l.* very short. *h.* 6in. to 8in. South Europe. An elegant plant, with tufted filiform stems. One of the best of dwarf-growing ornamental grasses. See Fig. 54.

AIR-PLANT. *See* Aerides, also **Epiphytes**.

AITONIA (in honour of W. Aiton, once Head Gardener at Kew). ORD. *Meliaceæ*. A small and rather interesting greenhouse evergreen shrub from the Cape of Good Hope, and thriving well in an equal mixture of sandy loam and peat. Young cuttings will

root in sand, under a bell glass, with bottom heat. The cuttings must not be put in very close together, and the glass should be wiped frequently, as they are apt to damp off.

> **A. capensis** (Cape). *fl.* pink; petals four, shorter than the projecting stamens. July. *h.* 2ft. 1777.

AIZOON (from *aei*, always, and *zoos*, alive; tenacious of life). ORD. *Portulacaceæ*. Greenhouse annuals, biennials, or evergreen shrubs. Flowers apetalous; calyx five-cleft, coloured on the inner surface. The undermentioned species is the only one worth growing. It requires no shade, a dry atmosphere, and light sandy soil. Propagated by seeds and cuttings.

> **A. sarmentosum** (sarmentose). *fl.* greenish, sessile. Summer. *l.* opposite, linear-filiform, rather connate, glabrous; branches rather villous, three-flowered at the apex, the two lateral flowers are bracteated, and spring from the sides of the middle one. Sub-shrub, erect, diffuse, glabrous, branched. South Africa, 1862.

AJAVA SEED. *See* **Ptychotis**.

AJAX MAXIMUS. *See* **Narcissus**.

AJOWAN. *See* **Ptychotis**.

AJUGA (from *a*, not, and *zugon*, a yoke; in reference to the calyx being equal, not bilabiate). Bugle. ORD. *Labiatæ*. Hardy annual or perennial herbaceous plants, usually procumbent or ascending, sometimes stoloniferous. Whorls two or many flowered, dense,

sometimes all axillary, when the floral leaves conform to those of the stem; sometimes the superior whorls are approximate into spikes, then the floral leaves are small, and of a different form from the stem ones. All the species are of easy cultivation in ordinary garden soil. Perennials increased by divisions, or by seeds sown in the open border, during spring or autumn. The seeds of annual kinds may be sown in the open border in spring, where they are intended to remain.

A. alpina (alpine). Synonymous with *A. genevensis*.

A. australis (southern). *fl.* blue; whorls six or more flowered; lower whorls remote, upper ones subspicate, floral leaves similar to the stem ones, exceeding the flowers. May to July. *l.* narrow-oblong, narrowed at the base, quite entire or sinuated, thickish, rather villous. Stem ascending, or erect. *h.* 6in. New Holland, 1822. Perennial.

A. Chamæpitys (ground-pine). *fl.* yellow, dotted with red, pubescent outside; whorls two-flowered; floral leaves similar to the others, exceeding the flowers. April. *l.* deeply trifid, with linear, quite entire, or trifid lobes. Stem procumbent at the base, much branched, beset with long hairs, like the leaves. *h.* about 6in. England (rare). Annual.

A. genevensis (Geneva).* *fl.* varying

from blue to rose colour and white; upper whorls spicate, lower ones distant, six or more flowered. May. *l.* stem ones oblong-elliptic or obovate, narrowed at the base; lower ones petiolate; floral ones ovate or cuneated; superior ones scarcely equalling the flowers or shorter, all usually coarsely toothed, membranaceous, green on both surfaces, and beset with scattered hairs. Stem erect, pilose. *h.* 6in. to 1ft. Europe. A very variable species, admirably adapted as an alpine plant, and succeeds best in bog soil, where its roots will have plenty of room; it increases rapidly. Perennial. SYNS. *A. alpina*, *A. rugosa*.

A. orientalis (oriental).* *fl.* blue; whorls six or more flowered, distant, or the upper ones are approximate. May. *l.* lower ones large, petiolate; ovate, coarsely and sinuately toothed, narrowed at the base; floral ones sessile, broad ovate, deeply lobed or toothed, exceeding the flowers. Stem ascending, pilosely woolly. *h.* 1ft. to 1½ft. Eastern Europe, 1732. This species should be grown in a dry, sunny spot.

A. pyramidalis (pyramidal).* *fl.* blue or purple; whorls many-flowered, upper ones or all spicate. May and June. *l.* stem ones approximate, scarcely petiolate,

obovate; floral ones broad-ovate, clasping the flowers, tetragonally pyramidate; the upper ones often coloured, all quite entire or obscurely sinuated. Stem erect. *h.* 6in. Scotland. Perennial. Of this there are several handsome garden varieties.



FIG. 55. FLOWER OF AJUGA REPTANS.

A. reptans (creeping).* *fl.* varying from blue to rose-colour; lower whorls remote; upper ones spicate, six to twenty flowered. May. *l.* ovate or obovate, quite entire or sinuated, and are, as well as the stem, nearly glabrous; radical one petiolate, stem ones nearly sessile. Stem creeping. The variegated and darkest leaved forms of this are superior to the type for horticultural purposes. Britain. Perennial. See Fig. 55.

A. rugosa (wrinkled). Synonymous with *A. genevensis*.

AKEBIA (its Japanese name). SYN. *Rajania*. ORD. *Lardizabalaceæ*. A pretty twining shrub, succeeding well in the south-western counties of England, or in Scotland, trained to a trellis, or rambling over other shrubs in the open; but, when so grown, it requires the protection of a mat in winter. It makes an excellent twiner for the cool greenhouse. Sandy loam, leaf soil, and peat are most suitable for its culture. Increased by root divisions and cuttings.

> **A. quinata** (five-leafletted).* *fl.* purplish brown, small, in axillary racemes, very fragrant. March. *l.* on very slender petioles, and palmately divided into usually five distinct petiolulate oval or oblong emarginate leaflets, the bottom pair smallest. *h.* 10ft. Chusan, 1845.

AKEE-TREE. *See* **Blighia sapida**.

ALA. A lateral petal of a papilionaceous flower.

ALANGIACEÆ. A very small order of trees or shrubs, usually with inconspicuous flowers, in axillary fascicles. Fruit succulent, eatable. The two genera best known in this country are *Alangium* and *Nyssa*.

ALANGIUM (from *Alangi*, the Malabar name of the first species). ORD. *Alangiaceæ*. Very showy stove evergreen trees, with alternate, exstipulate, entire leaves. Flowers few, sessile, in axillary fascicles; calyx campanulate; petals linear, spreadingly reflexed. They thrive well in a mixture of loam and peat, or any light rich soil. Cuttings root readily if planted in a pot of sand, with a hand glass placed over them, in heat.

A. decapetalum (ten-petaled).* *fl.* pale purple, with a grateful scent, solitary, or two to three together in the axils of the leaves; petals ten or twelve. June. *l.* alternate, oblong-lanceolate, quite entire; branches glabrous, spinescent. *h.* 30ft. Malabar, 1779.

A. hexapetalum (six-petaled). *fl.* purple, six-petaled. *l.* ovate-lanceolate, acuminated, velvety beneath. *h.* 30ft. Malabar, 1823.

ALATUS. Furnished with a membranous or thin wing or expansion.

ALBESCENT. Growing white.

ALBICANT. Growing whitish.

ALBINISM. A pale condition due to the absence of chlorophyl.

ALBIZZIA (named after an Italian). ORD. *Leguminosæ*. Ornamental greenhouse or hardy trees or shrubs. For culture, *see* **Acacia**, to which they are often referred.

A. Julibrissin (Julibrissin). *fl.* white; heads pedunculate, forming a terminal somewhat corymbose panicle. August. *l.* with eight to twelve pairs of pinnæ, each pinna bearing about thirty pairs of dimidiate-oblong, acute, rather ciliated leaflets. *h.* 30ft. to 40ft. Hardy. Levant, 1745. SYN. *A. Nemu*.

A. lophantha (crest-flowered).* *fl.* yellow; racemes ovate-oblong,

axillary, twin. May. *l.* with eight to ten pairs of pinnæ, each pinna bearing twenty-five to thirty pairs of linear, bluntish leaflets; petioles and calyces clothed with velvety down. *h.* 6ft. to 10ft. New Holland, 1803. A very distinct unarmed greenhouse species, and one of the best for window gardening.

A. Nemu. A synonym of *A. Julibrissin*.

ALBUCA (from *albicans*, or *albus*, white; the colour of the earlier species). ORD. *Liliaceæ*. A rather extensive genus of Cape of Good Hope bulbs, requiring ordinary greenhouse culture. Closely allied to *Ornithogalum*. Perianth six-cleft, three outer segments spreading; three inner ones closed over the stamens. They, however, succeed admirably when grown in a warm sunny position out of doors, if covered with a hand glass, or litter, during winter. A light loamy soil, with leaf mould and sand, suits them well. Propagated by offsets from the old bulb, or seeds. There are but few species worthy of cultivation.

A. angolensis (Angolan). *fl.* yellowish, large, in cylindrical racemes 1ft. to 1½ft. long. *l.* linear-lorate, sub-erect, fleshy, pale green, 1½ft. to 2ft. long. *h.* 3ft. Angola.

A. aurea (yellow).* *fl.* pale yellow, upright; peduncle very long, erect, spreading. June. *l.* linear-lanceolate, flat. *h.* 2ft. 1818.

A. fastigiata (peaked).* *fl.* white;

peduncle very long, spreading. May. *l.* linear, flattish, longer than the scape. *h.* 1½ft. 1774.

A. flaccida (weak). *fl.* pale yellow, with a green keel, drooping, six to eight in a loose raceme; peduncles spreading at right angles. July. *l.* lanceolate-linear, obliquely bent. *h.* 2ft. 1791.

A. Nelsoni (Nelson's).* *fl.*, perianth, 1½in. long, ascending, white, with a dull red stripe down the back of each segment; scape stout, 4ft. to 5ft. high. Summer. *l.* bright green, very concave at the basal part, nearly flat in the upper part, 3ft. to 3½ft. long, l¼in. to 2¼in. broad, at about one-third the way up, whence they are gradually narrowed to an acute point. Natal, 1880. This very handsome species is the best of the genus.

ALBUMEN. The substance under the inner coat of the testa of seeds, surrounding the embryo. It is sometimes absent.

ALBUMINOUS. Furnished with albumen.

ALBURNUM. The white wood of a tree; the younger wood, not choked up by sedimentary deposit, and therefore permeable to fluids.

ALCHEMILLA (from *Alkemelyeh*, the Arabic name of one of the species). Lady's Mantle. ORD. *Rosaceæ*. Hardy herbaceous perennials, with corymbose, apetalous flowers; calyx tubular, with the tube rather

contracted at the apex. Leaves palmate or lobed. Of very easy culture, in common, but well drained soil. They are well adapted for rockwork and planting near the front of borders. Easily increased by divisions of the roots, and seeds. All here described are hardy, except *A. sibbaldiæfolia*.

A. alpina (alpine).* *fl.* greenish, small; corymbose. June. *l.* digitate; leaflets five to seven, lanceolate-cuneated, obtuse, serrated, clothed with white satiny down beneath. *h.* 6in. Britain.

A. pubescens (pubescent). *fl.* greenish; corymbs terminal, crowded, clothed with a coating of long weak hairs. June. *l.* roundish-reniform, seven-lobed, toothed, silky beneath. *h.* 6in. to 8in. Caucasus (Higher), 1813.

A. sericea (silky).* *fl.* greenish, corymbose. June. *l.* digitate; leaflets seven, lanceolate-obovate, obtuse, connected at the base, serrated at the apex, clothed with satiny down beneath. *h.* about 6in. Caucasus, 1813. Much larger in every part than *A. alpina*, to which it is closely allied.

A. Sibbaldiæfolia (Sibbaldia-leaved). *fl.* white, conglomerate; stem corymbosely many-flowered at the apex. July. *l.* deeply three-parted, clothed with adpressed pubescence beneath; segments

deeply serrated, lateral ones bifid. *h.* 6in. Mexico, 1823. A greenhouse species, which should be grown in small well-drained pots, with a mixture of leaf soil and sandy loam.

ALDEA. A synonym of **Phacelia** (which *see*).

ALDER. *See* **Alnus**.

ALETRIS (from *aletron*, meal; referring to the powdery appearance of the whole plant). The American Star Grass. SYN. *Tritonia*. ORD. *Hæmodoraceæ*. Interesting hardy herbaceous perennials, closely allied to the *Amaryllids*. Perianth half-inferior, tubular; limb spreading or funnel-shaped; stamens inserted at base of perianth segments, filaments flat. They delight in a sunny but damp situation, with peat, leaf mould, and sand, and are slowly increased by division of the roots.

A. aurea (golden).* *fl.* yellow, bell-shaped. *h.* 1ft. to 2ft. North America, 1811. Similar in habit to *A. farinosa*.

A. capensis (Cape). *See* **Veltheimia viridifolia**.

A. farinosa (mealy).* *fl.* white, bell-shaped, in a terminal spiked raceme, upon stems 1½ft. to 2ft. high. *l.* lanceolate, ribbed. North America, 1768. A pretty species, forming a spreading tuft, and possessing intensely bitter properties.

ALEURITES (from the Greek word signifying floury; all the parts of the plant seeming to be dusted with a farinaceous substance). ORD. *Euphorbiaceæ*. A

handsome stove evergreen tree, with small, white, clustered flowers. Leaves alternate, stalked, exstipulate. Of easy culture in a loamy soil. Ripe cuttings, with their leaves untouched, root readily in sand, under a hand-glass.

A. triloba (three-lobed).* Candleberry Tree. *l.* three-lobed, 4in. to 8in. long. *h.* 30ft. to 40ft. Moluccas and South Pacific Islands, 1793.

ALEXANDERS. *See* **Smyrnium**.

ALEXANDRIAN LAUREL. *See* **Ruscus racemosus**.

ALGAROBA BEAN, or CAROB. *See* **Ceratonia**.

ALGAROBIA. Included under **Prosopis** (which *see*).

ALHAGI (its Arabian name). ORD. *Leguminosæ*. Manna Tree. Greenhouse shrubs or sub-shrubs, with simple leaves, and minute stipulas. Flowers few, in clusters. They thrive in pots filled with a mixture of sand, loam, and peat. Young cuttings will root in sand, with a bell glass placed over them, in heat; but by seeds, if they can be procured, sown in a hotbed, is a preferable mode of increasing the plants. They may be placed out of doors during the summer months.

A. camelorum (camels). *fl.* red, few, disposed in racemes along the peduncles. July. *l.* lanceolate, obtuse, simple; stipulas minute. Stem herbaceous. *h.* 1ft. to 2ft. Caucasus, 1816.

A. maurorum (Moors'). *fl.* purple in the middle, and reddish about the

edges, disposed in racemes along the axillary, spinose peduncles. July. *l.* obovate-oblong, simple; spines strong, and longer than those of the above species. *h.* 2ft. to 3ft. Egypt, &c. The Manna is a natural exudation from the branches and leaves of this shrub, which takes place only in very hot weather.

ALIBERTIA (in honour of M. Alibert, a celebrated French chemist, author of "Traite des Fievres Attaxiques," wherein he mentions the effects of Peruvian bark). ORD. *Cinchonaceæ*. A small stove evergreen tree, very ornamental when in flower. Flowers solitary or fascicled, diœcious; corolla leathery, tubular. A mixture of loam and peat is the best soil. Cuttings strike root freely, in a similar kind of soil, under a hand glass, in a moist heat.

A. edulis (edible). *fl.* cream-coloured, solitary or in fascicles, terminating the branches, almost sessile. June. *fr.* edible. *l.* opposite, leathery, oblong, acuminated, shining above, and bearded in the axils of the veins beneath. *h.* 12ft. Guiana, 1823.

ALICANT SODA. *See* **Salsola**.

ALISMA. (from *alis*, the Celtic word for water). Water Plantain. SYN. *Actinocarpus*. ORD. *Alismaceæ*. A genus entirely composed of hardy aquatic species. Flowers three-petalled. Leaves parallel-veined. Increased by division or seeds. The latter should be sown in a pot immersed in water, filled with loam,

peat, and sand, and the former root freely in a moist loamy soil. The British species are most easily grown.

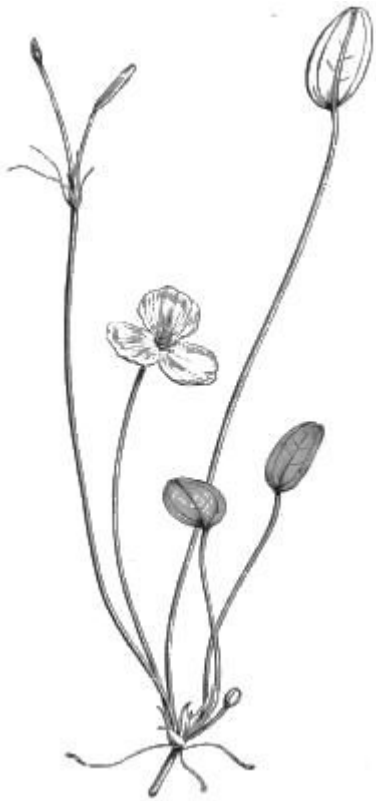


Fig. 56. Alisma natans.

A. natans (floating).* *fl.* white; peduncles simple. July. *l.* elliptical-obtuse; stem ones floating, on long stalks, scarcely nerved; those at the base of the plant are long, linear-lanceolate, membranous scales, or abortive root leaves. North Wales and Cumberland, but very rare; abundant in other parts of Europe. See Fig. 56.

A. Plantago (plantain).* *fl.* delicate pale rose coloured; scape branched upwards. July. *l.* ovate, acute, all radical, on long stalks; branches all whorled, bracteated, compound. *h.* 2ft. to 3ft. Britain. A very handsome aquatic for naturalising. See Fig. 57.

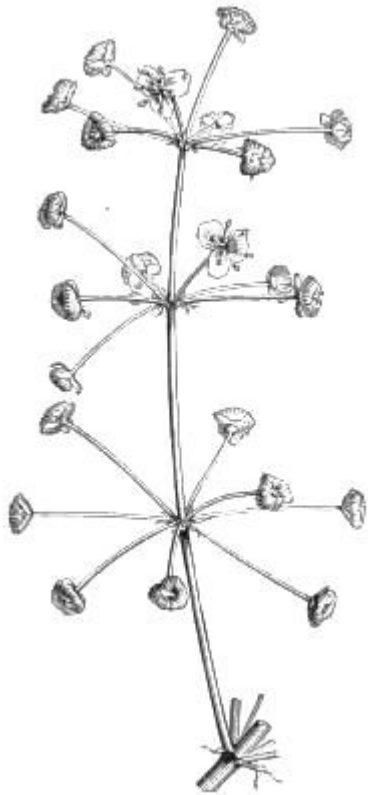


Fig. 57. Portion of inflorescence of Alisma Plantago.

A. P. lanceolata (lance-shaped leaves). *fl.* pure white. July. *l.*

lanceolate. Britain.

A. ranunculoides (ranunculus-like). In general appearance very like the last named species, but smaller. Britain.

ALISMACEÆ. A small order of aquatic or marsh plants, with three-petaled flowers, on leafless scapes, and simple radical leaves. The genera best known are *Alisma* and *Sagittaria*.

ALKANET. *See* **Anchusa tinctoria**.

ALLAMANDA (named in memory of Dr. Allamand, of Leyden, who first communicated seeds of this genus to Linnæus). ORD. *Apocynaceæ*. Elegant climbing evergreen stove plants. Peduncles terminal and many-flowered; corolla funnel-shaped, with a narrow tube, gamopetalous, large, inflated, five-cleft at the apex. Leaves verticillate. This genus differs from all others of the same order, in the figure of the corolla. Of comparatively easy culture. To obtain their beauty of foliage and flowers, the shoots should be tied to wires placed within 8in. or 9in. of the glass that forms the roof of the structure in which the plants are growing. Trained in this way, and the shoots allowed to ramble in a somewhat natural manner, the effect, when the plants are in flower, is grander and more pleasing in every respect than when the shoots are tied to a formal trellis, of whatever shape. When thoroughly established, they succeed admirably in a compost of three parts good fibry loam, and one part wood charcoal or coarse river sand, with some rotten cow manure added. When potting the plants, make the fresh compost firm round the old balls of soil, and do not fill the pots too full; leave room for plenty of water, as,

when in active growth, they require a liberal daily supply. They must be pruned annually in January or February, cutting the previous year's shoots back to within a joint or two of the old wood. Allamandas should be exposed to the light as much as possible at all seasons of the year. In winter months they require but little water, but the drainage must always be perfect. They are remarkably free from insect attacks of any kind. It may be also observed that the temperature should never fall below 55deg. This genus is easily propagated by cuttings, which will root at any time of the year in a bottom heat of from 70deg. to 80deg. The usual time is, however, in spring, when the old plants are pruned back. Choose the tops of the shoots, retaining two or three joints to each cutting; place these in a compost of sand and peat or leaf mould in equal proportions, singly, in small pots. Press the soil firmly around each cutting, and, when all are inserted, give a good watering, and plunge the pots in the propagating bed. Attend to shading and watering, and in about three weeks' time they will have emitted roots, and started to grow at the tops. The pots should now be raised out of the plunging material, and placed upon the surface thereof, and there allowed to remain two or three weeks longer; when the young roots will have, by this time, filled the little pots, and a shift into the larger ones will be necessary. Return the plants to the propagating bed, but do not plunge them therein. As soon as it is certain that the roots have commenced growth in the fresh soil, pinch the point of each plant that is intended to be grown on a trellis. This will cause the remaining buds to push out fresh shoots; and these, as soon as they have made two joints or whorls of leaves each, should have their points pinched out also. By repotting the

plants as often as they fill their pots with roots during the first season of their growth, and pinching the points out of the shoots twice or thrice in the same time, a good foundation will be formed, from which the future specimens will spring. In the case of plants intended to be trained up rafters or pillars, they should not have their points pinched out until they attain to the height where it is desirable they should have more than one shoot, and be repotted as recommended above, for the first year; but, after that, they will require to be repotted only once a year, and this should be done soon after the buds have started to grow afresh in the spring.

A. Aubletii (Aublet's).* *fl.* yellow, large. June. *l.* four to five in a whorl, broad-oblong, acuminated, rather hairy beneath. Guiana, 1848.

A. cathartica (purging).* *fl.* yellow, large. June. *l.* four in a whorl, obovate, obtuse, acutish, with sub-undulated edges, glabrous. Guiana, 1785. SYN. *A. Linnæi.*

A. chelsoni (Chelsea).* *fl.* yellow, large. Summer. This splendid plant is least suited of any for trellis training, from its wood being stiffer and harder, and is therefore best for the roof of a house; it is one of the best kinds for cutting. Garden hybrid.

A. grandiflora (large-flowered).* *fl.* distinct pale yellow, rather large, very free bloomer. June. Brazil, 1844.

A. Linnæi (Linnæus's). Synonymous

with *A. cathartica*.

A. neriifolia (oleander-leaved).* *fl.* deep golden yellow, elegantly streaked with orange, between funnel and bell shaped, the tube being wide, 1in. long; panicle many-flowered. June. *l.* oblong, on short petioles, acuminate. *h.* 3ft. South America, 1847. Shrub erect, glabrous.

A. nobilis (noble).* *fl.* bright yellow, rather deeper tinted in the throat, large, full circular form, but without streaks or any other markings. July. *l.* in whorls of four or of three, tapered to the base, sessile, oblong, abruptly acuminate, membranaceous, hairy on both surfaces, especially beneath and on the midrib. Brazil, 1867. One of the best species.

A. Schottii (Schott's).* *fl.* yellow, large, throat beautifully striped with rich brown. September. *l.* oblong, acuminated, four in a whorl, quite glabrous, on both surfaces. *h.* 10ft. Brazil, 1847. This species is a very strong grower, and suits the roof system best; it is also a very free bloomer.

A. verticillata (whorl-leaved). *fl.* yellow, large. June. *l.* usually six in a whorl, ovate-oblong, obtuse, quite glabrous. South America, 1812.

A. violacea (violet). *fl.* purple. Brazil, 1859.

ALLANTODIA (from *allantos*, a sausage; in reference to the cylindrical form of the indusium). ORD. *Filices*. A greenhouse monotypic genus, differing from *Asplenium* in the dehiscence of the involucre, and it may receive similar treatment to the Spleenworts. Sori dorsal, linear-oblong, attached to the primary veins. Involucre the same shape as the sorus and quite inclosing it, bursting in an irregular line down to the centre.

A. Brunoniana (Brown's).* *fronds* often 1ft. to 2ft. long, ½ft. to 1ft. broad; pinnæ 3in. to 6in. long, 1in. broad, entire. *sori* confined to the anterior vein of the first fork. Himalayas, up to 6000ft., &c. SYN. *Asplenium javanicum*.

ALLARDTIA. *See* **Tillandsia**.

ALLEYS. Small walks of various widths, but generally 1½ft. or 2ft. wide, and formed in right lines, parallel to the main walks, or borders, sometimes covered with a thin coat of sand, gravel, or shells, or paved with flints, pebbles, &c. Spaces left between beds of seedling plants are generally meant when alleys are referred to.

ALL-HEAL. *See* **Prunella vulgaris**.

ALLIACEOUS. Pertaining to the *Garlic* family.

ALLIARIA. *See* **Sisymbrium**.

ALLIGATOR APPLE. *See* **Anona palustris**.

ALLIGATOR PEAR. *See* **Persea gratissima**.

ALLIUM (from *all*, meaning hot or burning; in allusion to the well-known properties of the Onion tribe). Including *Porrum*, *Schœnoprasum*. ORD. *Liliaceæ*. Hardy bulbous plants, with flat or terete radical leaves, and capitate or umbellate flowers, enclosed in a membranous spathe at the summit of a slender, naked, or leafy scape; perianth spreading or campanulate. They are of very easy culture, increasing rapidly by offsets. The little bulbs, which are produced in clusters, may be separated and replanted, in autumn or early spring, about 4in. deep. Seeds are also easily obtainable. These may be sown thinly in light soil, in February or March, where they should remain until the autumn or following spring, when they may be transplanted to their flowering situations. During the growing season, all the attention required will be to keep the plants free of weeds, and place stakes to the tall-growing kinds.

A. acuminatum (taper-pointed).* *fl.* deep rose, ½in. to 1in. across, in many-flowered umbels. July and August. *l.* rather shorter than the stems, very narrow, only about a line wide. *h.* 6in. to 10in. North-West America, 1840.

A. a. rubrum (red). *fl.* deep red-purple; in other respects like the type. California.

A. ascalonicum (Eschallot). *fl.* purple; umbels globose; scape rounded. Summer. *l.* subulate. *h.* 9in. Palestine, 1546. For culture, *see* **Eschallot**.

A. azureum (sky-blue).* *fl.* deep sky-blue, with a dark line through the middle of each division; umbels dense, globular, longer than the spathes which envelop them before expanding. Summer. *l.* triangular, from 6in. to 12in. long. *h.* 1ft. to 2ft. Siberia, 1830. One of the handsomest species grown.

A. Bidwelliæ (Mrs. Bidwell's).* *fl.* bright rose, about ½in. across, in few-flowered umbels. July. *l.* narrow, rather longer than the stem. *h.* 2in. to 3in. Sierra Nevada, 1880. A very charming little species for the rockery.

A. Breweri (Brewer's).* *fl.* deep rose, nearly or quite 1in. across, in few-flowered umbels. July. *l.* much longer than the flower-stem, ¼in. or more broad. *h.* 1in. to 3in. California, 1882.

A. Cepa (common Onion). *fl.* white; scape ventricose, longer than the leaves. June, July. *l.* fistular, rounded. *h.* 3ft. For culture, *see* **Onion**.

A. C. aggregatum. Aggregated, Tree, or Potato Onion. *See* **Onion**.

A. cœruleum (blue-flowered).* *fl.* blue, in large compact globular heads. June. *h.* 8in. Russia, 1840. Very distinct.

A. Douglasii (Douglas').

Synonymous with *A. unifolium*.

A. Erdelii (Erdel's). *fl.* white, keeled with green, in compact umbels. *h.* 6in. Palestine, 1879. A rare but pretty species, and should be planted in a warm position on the rockery.

A. falcifolium (sickle-leaved).* *fl.* pale rose, ½in. to ¾in. across, in few-flowered umbels. August. *l.* two in number, thick, broadly linear, falcate. *h.* 2in. to 3in. North-West America, 1880.

A. falciforme (sickle-formed). Probably a variety of *A. unifolium*, with pure white flowers, in several-flowered umbels. *h.* 6in. California, 1882.

A. flavum (golden). *fl.* yellow, bell-shaped, and somewhat drooping, in pretty umbels; scape leafy at the base. *l.* round, not hollow, flattish above the base. *h.* about 1ft. Italy, 1759. A slender species.

A. fragrans. *See* **Nothoscordum**.

A. karataviense (Karatavian). *fl.* white, in dense globose heads. May. *l.* very broad, flat, glaucous, sometimes variegated. *h.* 6in. Turkestan, 1878.

A. Macnabianum (MacNab's).* *fl.* deep magenta, a colour quite unique in this family, in large umbels. *l.* nearly as long as the stem,

channelled, about ¼in. broad. *h.* 1ft. North America.

A. magicum (enchanting). Synonymous with *A. nigrum*.



Fig. 58. Allium Moly.

A. Moly (Moly).* *fl.* bright yellow, numerous, in compact umbels. Spring. *l.* few, broadly lanceolate. Stem sub-cylindrical. *h.* 10in. to 15in. South Europe, 1604. A very old favourite; bright-flowered and very fine in masses. See Fig. 58.

A. Murrayanum (Murray's).* *fl.* rosy purple, in large heads. *l.* narrow, longer than the stem. *h.* 1ft. North America. A good variety of *A. acuminatum*.

A. mutabile (changeable). *fl.* white, changing to rose, in many-flowered umbels. July. *l.* shorter than the stem, narrow, channelled. *h.* 12in. to

24in. North America, 1824.

A. neapolitanum (Neapolitan).* *fl.* white, with green stamens, numerous, in a loose umbel, on stems exceeding the leaves in length; pedicels much longer than the flowers. Early summer. *l.* two or three, sheathing the flower stem, strap-shaped, about 1in. across. *h.* 15in. to 18in. South Europe, 1823. Probably the most ornamental white-flowered species.

A. nevadense (Sierra Nevada). *fl.* white, or pale rose, about ½in. across, in several-flowered umbels. July. *l.* flat, rather longer than the stem, about ¼in. wide. *h.* 3in. to 6in. Sierra Nevada and Utah, 1882.

A. nigrum (blackish).* *fl.* dull violet, or whitish, with a green vein, very numerous, in a large umbel. Summer. *l.* thick, broadly lanceolate, acute, ciliated, toothed at the edges, at first erect and glaucescent, afterwards green and spreading, much shorter than the stem. *h.* 2½ft. to 3¼ft. South of Europe. Very vigorous and free flowering. SYN. *A. magicum.*

A. paradoxum (wonderful). *fl.* white, gracefully pendulous, borne on long footstalks springing from little nests of yellow bulbils. Spring. *l.* one or two, as long as the scape, linear-lanceolate, acute, keeled,

striated, smooth, ¼in. broad, drooping and recurved. *h.* 9in. to 14in. Siberia, 1823.

A. pedemontanum (Piedmont).* *fl.* rosy-purple, large, bell-shaped, in large, graceful drooping clusters. July. *l.* lanceolate, shorter than the stem. Piedmont, 1817. A neat little plant for rockwork, or warm border. One of the handsomest species grown.

A. reticulatum (netted). *fl.* varying from pink to white. Summer. *l.* narrow, or almost filiform, shorter than the stem. *h.* 9in. to 15in. North-West America, 1882. A rare species.

A. r. attenuifolium (attenuate-leaved).* This may be regarded as an extremely handsome white-flowered variety. North-West America.

A. roseum (rose-coloured).* *fl.* pale lilac-rose, large, in umbels of ten or twelve; stems round, rather longer than the leaves. Summer. *l.* strap-shaped, channelled, rolled inwards at the top, not hairy. *h.* 12in. to 16in. South Europe, 1752.

A. sativum (cultivated). Garlic. *fl.* white; umbel bulbiferous. Summer. *l.* flat. *h.* 1½ft. Sicily, 1548. For culture, *see* **Garlic**.

A. schœnoprasum (rush-leaved onion). Chives. *fl.* purple; umbel

many-flowered, globose, without bulbils. June and July. *l.* cylindrical, somewhat tapering towards the point; stem with one leaf, or naked. *h.* 1ft. England. For cultivation, *see* **Chives**.

A. Scorodoprasum. Rocambole; Sand Leek. *fl.*, perianth ⅓in. long, the segments red-purple, with white margins; head loose-flowered, with purple bulbils; scape slender. May to August. *l.* 6in. to 8in. long, flat, keeled, the edges scabrid. *h.* 3ft. Europe (Britain), 1596. *See also* **Rocambole**.

A. sphærocephalum (globe-headed).* *fl.* densely packed in a subspherical head; in a bud state the upper ones are reddish-purple, the lower green. June. *l.* narrow, shorter than the long terete stems. *h.* 1½ft. to 2½ft. South Europe, 1759.

A. stramineum (straw-coloured). *fl.* yellow, in dense globular umbels. July. *l.* narrow, shorter than the stems. *h.* 1½ft. to 2ft. Siberia.

A. striatum (striated). *See* **Nothoscordum**.

A. triquetrum (three-cornered). *fl.* white, somewhat bell-shaped, with a narrow streak of pure green down each petal, in a loose, slightly drooping umbel, on erect triangular stems shorter than the leaves.

Summer. *l.* green, broadly strap-shaped, keeled in a triangular manner, sometimes very long. *h.* 12in. to 18in. South Europe, 1789.

A. unifolium (one-leaved). *fl.* bright rose. July. *h.* 1ft. to 2ft. California, 1873. A handsome species, from California, resembling *A. roseum*, but differing from all known species by the circumstance that its bulbs are developed at a distance from each other, and are connected by a thread-like rhizome, ½in. to 1in. long. SYN. *A. Douglasii*.



FIG. 59. ALLIUM URSINUM.

A. ursinum (bear). Broad-leaved

Garlic; Ramsons. *fl.* pure white, with acute perianth segments; umbel level at top; scape triangular. Summer. *l.* one or two, radical, ovate-lanceolate, stalked, large, bright green. *h.* 1ft. Britain. See Fig. 59.

A. validum (strong). *fl.* pure white or rose-coloured, in large, rather drooping umbels. Summer. *l.* ¼in. to ½in. broad, nearly as long as the stem. *h.* 12in. to 30in. Oregon and California, 1881. A pretty species.

A. Victorialis (Victoria's). *fl.* greenish-white, in many-flowered, spicate umbels. May. *l.* broadly ovate-oblong, channelled, shorter than the stem. *h.* 1½ft. to 2ft. Southern and Eastern Europe, 1739. Conspicuous from its broad leaves. Rare.

ALLOBROGIA. A synonym of **Paradisia** (which *see*).

ALLOCHLAMYS. A synonym of **Pleuropetalum** (which *see*).

ALLOPHYLLUS. A synonym of **Schmidelia** (which *see*).

ALLOPLECTUS (from *allos*, diverse, and *pleco*, to plait; the calyx appears as if it was plaited in diverse directions). ORD. *Gesneraceæ*. Very handsome stove evergreen shrubs. Corolla tubular or club-shaped, straightish; calyx coloured. Leaves opposite, one in each pair smaller than the other, petiolate, fleshy, scattered or decumbent, or erect, the under surface generally reddish; branches opposite. For cultivation,

see **Gesnera**.

A. bicolor (two-coloured). *fl.* yellow, purple; corolla pilose; pedicels axillary, one-flowered. June. *l.* ovate, oblong, acuminate, denticulate, pilose above, downy beneath; branches tetragonal. *h.* 1ft. New Grenada, 1840. Plant erect, rather woody.

A. capitatus (headed). *fl.* capitate; sepals red, leafy; corolla silky, ventricose above the middle; peduncles axillary. March. *l.* large, ovate, serrated, downy, reddish beneath. Stem bluntly tetragonal, red. *h.* 2ft. South America, 1847.

A. dichrous (two-coloured). *fl.* purple, yellow, axillary, crowded, nearly sessile. *l.* ovate-lanceolate, quite entire, pubescent. Brazil, 1845. A climber.

A. peltatus (peltate-leaved).* *fl.* whitish, about 2in. long, in axillary tufts. August. *l.* opposite, one is 1in. to 2in. long, and the other 6in. to 9in. long, and 2in. wide, oblong, shortly acuminate, rounded, peltate at the base, and raised on stout footstalks, 1in. to 2in. long. *h.* 1ft. Costa Rica, 1877.

A. repens (creeping). *fl.* yellow; corolla with curved tube, four lobed; sepals ovate, spotted; peduncles axillary, solitary. February. *l.* ovate,

rather fleshy, serrate, on short petioles. St. Martha, 1845. Plant downy; an evergreen trailer.

A. vittatus (striped). *fl.*, calyx crimson; corolla pale yellow; terminal and fasciculate, surrounded by vivid red foliaceous bracts. *l.* large, shortly-stalked, broadly-ovate, of a deep velvety green, having a broad greyish-green band down the centre, branching off along the course of the principal veins. Stems erect, fleshy. Peru, 1870.

A. zamorensis (Zamora).* *fl.* yellow; sepals orange-red. *h.* 1ft. Columbia, 1875.

ALLOSORUS. *See* **Cryptogramme** and **Pellæa**.

ALLOTMENT GARDENS. A system of assigning small portions of land to be cultivated by labourers after their ordinary day's work.

The following are the most important rules to be carried out; but, should occasion arise, other rules must be made to meet particular cases:—

1. Each Allotment should consist of a rood of land (=¼ acre) to be let yearly at a rent of not more than 10s.

2. The Allotment to be let for one year only, to be re-let to the same occupier, provided his character has been satisfactory during the preceding year.

3. The rent shall be considered due at Michaelmas. If it remains unpaid for one month after that date, the Allotment shall be forfeited.

4. The Allotment to be cultivated solely by spade husbandry, and the same crop shall not be planted on the same part two years in succession.

5. Separate Allotments shall be divided by a space not less than 18in.

6. Any occupier trespassing on his neighbour's Allotment, or in any way interfering or damaging the same, shall not be allowed to hold his Allotment after the expiration of the year.

ALLSPICE. *See* **Calycanthus**.

ALLSPICE TREE. *See* **Pimenta**.

ALMEIDEA (in honour of J. R. P. de Almeida, a Brazilian, who was of great assistance to St. Hilaire while travelling in Brazil). ORD. *Rutaceæ*. Stove trees or shrubs with alternate, simple, entire, stalked leaves. Racemes terminal, divided at the apex into compound thyrse-like panicles. The undermentioned species will grow freely in a mixture of loam, sand, and peat. Partly ripened cuttings will root in sand under a hand glass, in heat.

A. rubra (red). *fl.* pink; petals very blunt; racemes compound. September. *l.* lanceolate, acute at base. *h.* 12ft. Brazil, 1849. Evergreen shrub.

ALMOND. *See* **Amygdalus**.

ALMOND-LEAVED WILLOW. *See* **Salix triandra**.

ALNUS (from *al*, near, and *lan*, the bank of a river; general habitat of the genus). The Alder Tree. ORD. *Betulaceæ*. A genus of deciduous trees and shrubs. Flowers monœcious; barren ones in long drooping autumnal catkins, lasting through the winter; fertile

ones, produced in spring, in oval catkins, resembling a fir-cone in shape, the fleshy scales of which become indurated and ligneous as they approach maturity. Leaves stalked, roundish, blunt. Propagated usually by seeds, which are gathered towards the end of October; they require to be well dried, in order that the cones do not become mouldy. The seeds are sprinkled lightly on the ground with the slightest possible covering. Towards the end of the year, the seedlings will be about 10in. high. They are then planted in rows 1½ft. apart, and 6in. from each other, where they may remain for two years, after which they can be placed out in the situations where they are intended to stand. Planting is best done in November or March; and, if it is designed to make a plantation of Alder, the young trees should be put in holes, made with an ordinary garden spade, about 9in. deep, and about 4ft. apart. They are also increased, but rarely, by cuttings, by suckers, and by grafting.

A. cordifolia (heart-shaped-leaved).* *fl.* greenish-brown. March and April, before the development of the leaves. *l.* heart-shaped, acuminate, dark green, and shining. *h.* 15ft. to 50ft. Calabria and Naples, 1820. A large, very distinct, and handsome round-headed tree. It grows rapidly in dry soil, and is one of the most interesting of ornamental trees.

A. firma (firm).* *l.* oval lanceolate, acuminate, sharply serrated, many-nerved. Japan. One of the most distinct of all the Alders.

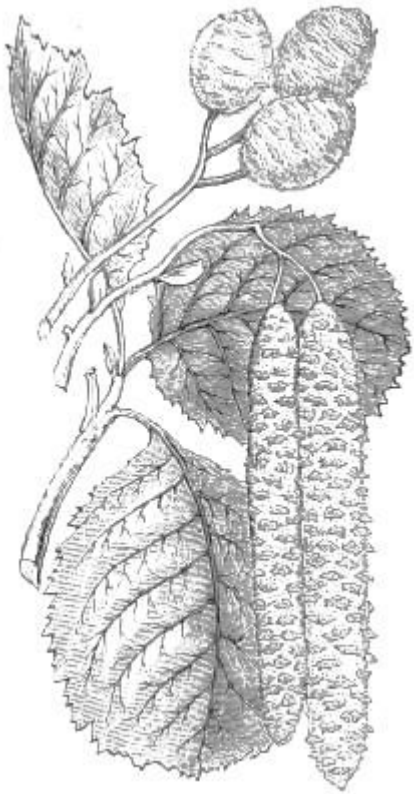


Fig. 60. Alnus glutinosa, showing Catkins and Fruit.

A. glutinosa (sticky).* *barren catkins* long, large, and cylindrical, pendent, their footstalks branched. *fertile catkins* small, ovate, with deep red scales. Spring. *l.* roundish-cuneiform, obtuse lobed at the margin, and serrated, somewhat glutinous, downy in the axils of the nerves beneath. *h.* 50ft. to 60ft. Britain. The Alder affects moist and damp situations, and, as it grows quickly, it is a useful tree to plant in bare

situations. It is valuable as a nurse to other trees by the sea-side. See Fig. 60.

A. g. aurea (golden).* Foliage golden colour.

A. g. incisa (incised).* Compact form, with leaves quite like those of common hawthorn. SYN. *A. g. oxyacanthifolia*.

A. g. laciniata (cut).* *l.* oblong and pinnatifid, with the lobes acute. This has elegant drooping branches and fern-like leaves, and is one of the best.

A. g. oxyacanthifolia (sharp-prickled). Synonymous with *A. g. incisa*.

A. g. quercifolia (oak-leaved).* *l.* with a sinuate outline, like that of the common oak. A very distinct form. The variety *imperialis* (=*asplenifolia*) slightly differs in its more or less lobed or cut foliage; *A. g. variegata* is a variegated form.

A. incana (hoary).* *l.* broadly oval or ovate, rounded at the base, sharply serrate, whitened, and mostly downy beneath. *h.* 8ft. to 20ft. North Temperate regions. This affects drier situations than our native *A. glutinosa*.

A. viridis (green). *fertile catkins* slender stalked, clustered, ovoid. *l.*

round oval or slightly heart-shaped, glutinous and smooth or softly downy beneath, serrate, with very sharp and closely set teeth. Mountainous regions of northern hemisphere.

ALOCASIA (from *a*, without, and *Colocasia*). Allied to *Colocasia*. ORD. *Aroideæ*. Stove plants of great beauty, often with large and handsomely variegated, usually peltate, leaves, and shortly petiolate glaucous spathes. They are not difficult to grow, with a strong moist heat, and an abundant supply of water to the roots. The soil should consist of fibrous peat, with a little light fibry loam, in large lumps; to this add a good proportion of sphagnum and lumps of charcoal, with plenty of silver sand. Keep the bulbs and soil raised well above the rim of the pots, and finish off with a surfacing of either sphagnum or cocoa-nut fibre. The latter will soon encourage new rootlets. Crock the pot quite two-thirds up with clean, broken potsherds. Water freely when in good growth, and give liquid manure once or twice a week through the growing season. Shade during bright sunshine in the spring and summer months. Increased by seeds and division of the stems or rhizome. Winter temperature, 60deg. to 65deg.; summer, 75deg. to 85deg. *See also* **Caladium** and **Colocasia**.

A. alba (white). *fl.* white. *h.* 1½ft. Java, 1854.

A. amabilis (lovely). Synonymous with *A. longiloba*.

A. chelsonii (Chelsea).* An interesting hybrid between *A. cuprea* and *A. longiloba*. *l.* large, upper

surface deep green, glossy and metallic, under side purplish, as in *A. cuprea*.

A. cucullata (hood-leaved). *fl.* green, whitish. Spring. *h.* 2ft. India, 1826.

A. cuprea (coppery).* *fl.*, spathe purplish-red, with short lamina. *l.* cordate-ovate, peltate, deflexed, 12in. to 18in. long, rich bronze colour, purple beneath. *h.* 2ft. Borneo, 1860. SYNS. *A. metallica*, *Xanthosoma plumbea*.

A. gigantea (gigantic). Synonymous with *A. longiloba*.

A. guttata (spotted). *fl.*, spathe white, spotted with purple. *l.* leafstalk also spotted. *h.* 2½ft. Borneo, 1879.

A. hybrida (hybrid).* A cross between *A. Lowii* and *A. cuprea*. *l.* elliptic in outline, with a very short acuminate point, and very slightly parted at the base, deep olive-tinted green on the upper surface, having stout, well-defined ribs, and the margin of an ivory white; dull purple at the back.

A. illustris (bright). *l.* ovate-sagittate, rich green, with olive-black patches, deflexed, 1½ft. long. India, 1873.

A. Jenningsii (Jennings's).* *l.*

peltate, cordate-ovate, acuminate, with their blades deflexed from the top of the erect mottled stalks, ground colour green, surface marked with large wedge-shaped blotches of dark brown; veins bright green, 6in. to 8in. long. India, 1867. A very distinct and free growing species.

A. Johnstoni (Johnston's).* *l.* semi-erect, arrow-shaped, peltate, the front lobe being about 12in. long, and the two back lobes 14in. long and divergent, olive-green, prettily variegated and strikingly veined with bright rosy red. The leafstalks are furnished at intervals with irregular whorls of stiff spines, the points of which are turned upwards. Stem darkly mottled with flesh-coloured bands just above the spines. Solomon Isles, 1875. This plant has quite a unique appearance.

A. Liervalii (Lierval's). *l.* bright green. Philippines, 1869.

A. longiloba (long-lobed). *l.* large, sagittate, with the upper part spreading out, green, with silvery veins. *h.* 4ft. Java, 1864. SYNS. *A. amabilis*, *A. gigantea*.

A. Lowii (Low's). *fl.*, spathe white. *l.* cordate-sagittate, 14in. to 16in. long, peltate, deflexed, olive-green, with thick white ribs, deep purple beneath. Borneo, 1862.

A. macrorhiza (long-rooted). *fl.* green, whitish. *h.* 5ft. Polynesia.

A. m. variegata (variegated). *l.* large, somewhat cordate, with slightly waved margins, bright green, blotched and marbled with white, sometimes nearly quite white; footstalks broadly streaked with pure white. Ceylon. A very striking and effective large growing plant.

A. Marshallii (Marshall's). *l.* green, with dark blotches, and broad central silvery band. India, 1811.

A. metallica (metallic). Synonymous with *A. cuprea*.

A. navicularis (boat-shaped spathe). *fl.*, spathe boat-shaped, whitish. *h.* 1ft. India, 1855.

A. Roezlii. *See* **Caladium marmoratum**.

A. scabriuscula (roughish).* *fl.*, spathe entirely white; limb 3in. long, oblong, cuspidate. *l.* spreading, not deflexed, sagittate, not in the least peltate, deep shining green above, pale green beneath, extreme length 22in. to 31in. *h.* 4ft. to 4½ft. North-West Borneo, 1878. Although this is not such an ornamental species as *A. Lowii*, *A. Thibautiana*, or *A. cuprea*, it has the merit of being a much larger and bolder plant than either of these, and is one of the largest species in the genus.

A. Sedeni (Seden's).* A hybrid between *A. Lowii* and *A. cuprea*. *l.* oval, cordate, sagittate, deflexed, bronzy green, purple beneath, veins distinct ivory white.

A. Thibautiana (Thibaut's).* *l.* ovate-acute, deeply cordate; basal lobes rounded and not sharply pointed, deep olive greyish-green, traversed by numerous grey veinlets branching from the midrib, which is greyish-white, purple beneath. Borneo, 1878. This is said to be by far the finest of the genus.

A. variegata (variegated). *fl.* whitish. *l.* leafstalk mottled with violet. India, 1854.

A. zebrina (zebra).* *l.* erect, broadly sagittate, rich dark green borne upon stout footstalks, which are pale green, mottled and striped with zigzag bands of dark green. *h.* 4ft. or more. Philippine Isles, 1862.

ALOE (from *Alloeh*, its Arabic name). Allied genera: *Apicra*, *Haworthia*, *Pachidendron*, *Phylloma*. Including *Rhipodendron*. ORD. *Liliaceæ*. This hitherto much confused genus, and its allies, have been completely revised by Mr. J. G. Baker (*vide* "Journal of the Linnean Society," vol. xxviii. pp. 152-182), to whose account we are indebted for many of the following particulars:—Plant with or without stems; shrubs or (rarely) trees; leaves thick, fleshy, frequently in a rosette; peduncles simple or racemed, endowed with few or many empty bracts. Flowers racemed;

pedicels bracteated at base, solitary; perianth-tube straight or slightly recurved; segments elongated; stamens hypogynous, as long as the perianth, or longer. Mr. Baker describes over eighty species, many of which, for various and important reasons, have no claim upon our space. Natives of the Cape of Good Hope, except where otherwise stated. These very interesting and curious plants thrive well in a mixture of open loam and peat, together with a small quantity of well decomposed manure. If old brick rubbish, or any other similar material is mixed with the soil to ensure perfect and rapid drainage, so much the better. Water, especially during winter, must be carefully administered. They thrive in an ordinary greenhouse, and cannot have too much light at any time.

A. abyssinica (Abyssinian).* *fl.*, perianth twelve to fifteen lines long; raceme dense-oblong, 3in. to 4in. long, and 2in. to 3in. broad; lower pedicels nine to twelve lines long; peduncle branched, 1½ft. to 2ft. *l.* about twenty in a rosette, ensiform, 1½ft. to 2½ft. long, acuminate, green, sometimes spotted, five to six lines thick in middle; back rounded; marginal prickles distant, deltoid, one to two lines long. Stem simple, 1ft. to 2ft. long, 2in. to 3in. in diameter. Abyssinia, 1777. SYN. *A. maculata*.

A. a. Peacockii (Peacock's). This is a rare variety.

A. africana (African). *fl.*, perianth yellow, fifteen to eighteen lines long;

racemes dense, 1ft. in length, 3in. in diameter; peduncle very strong, branched. *l.* in a dense rosette, ensiform, 1½ft. to 2ft. long, 2½in. to 3in. broad, slowly narrowing from base to the apex, channelled above the middle, where it is four to five lines thick; marginal prickles close, one and a half to two lines long. Stem simple, when fully grown, 20ft.

A. albispina (white-spined).* *fl.*, perianth red, 1½in. long; raceme dense, nearly 1ft. long, 4in. broad; lower pedicels fifteen to eighteen lines long; peduncles simple, 1½ft. *l.* loosely disposed, lanceolate, ascending, 6in. to 8in. long, 2in. broad, green, without spots or lines; face concave upwards; middle three to four lines thick; back sparingly tubercled; marginal prickles white, horny, two lines long. Stem simple, short, 1in. to 1½in. in diameter. 1796.

A. albocincta (white-banded).* *fl.*, perianth brilliant red, ten to twelve lines long; racemes twenty or more, shortly capitate, 2in. to 2½in. in diameter when expanded; pedicels ascending, six to nine lines long; scape stout, branched, 1½ft. to 2ft. *l.* twelve to twenty in a dense rosette, outer ones recurved, lanceolate, 1½ft. to 2ft. long, 4in. to 6in. broad, glaucous, obscurely lined and

spotted; middle three to four lines thick; margin red or white tinted. Stems in old specimens, 1ft. to 2ft. long, 3in. to 4in. in diameter. SYNS. *A. Hanburyana*, *A. paniculata*, and *A. striata*.

A. arborescens (tree-like).* *fl.*, perianth red, fifteen to eighteen lines long; raceme dense, about 1ft.; pedicels ascending, twelve to fifteen lines long; peduncles strong, 1½ft., simple or branched. *l.* (rosette 3ft. to 4ft. in diameter) dense, aggregate, ensiform, 1½ft. to 2ft.; base 2in. broad, thence to apex attenuated, acuminated, green, rather glaucous, without spots or lines; middle three to four lines long; base five to six lines thick; upper surface beyond the base channelled; marginal prickles close, one and a half to two lines long, horny. Stem simple, finally 10ft. to 12ft. long, 2in. to 3in. in diameter. 1700.

A. a. frutescens (shrubby). Dwarfer. *l.* often loose, and shorter, intensely glaucous; peduncle simple. Stem slender, sometimes racemosed.

A. aristata (awned). *fl.*, perianth red, fourteen to sixteen lines long; raceme simple, loose, 4in. to 6in. long, and about 4in. broad; pedicels sub-patent, thirteen to eighteen lines long; scape simple, 1ft. *l.* about fifty in a dense rosette, ascending,

lanceolate, 3in. to 4in. long, six to eight lines broad, without spots or lines; face flat, sparingly tubercled; middle one and a half lines thick; back copiously tubercled; apex bearded with a pellucid awn; marginal teeth diffuse, white, half line long. 1824.

A. Bainesii (Baines').* *fl.*, perianth fifteen to sixteen lines long, yellowish red; raceme simple, dense, oblong, 3½in. to 4in. in diameter when expanded; pedicels thick, two to three lines long; peduncles upright, strong, eight to nine lines in diameter. *l.* closely packed at the top of the branch, ensiform, 1ft. to 1½ft. long, 2in. to 3in. in diameter, green, spotted, deeply channelled, recurved; middle two to three lines thick; marginal prickles pale, rather distant, one to one and a half lines long. Arborescent, branched. *h.* 40ft. to 60ft.; trunk 4ft. to 5ft. in diameter. SYNS. *A. Barberæ*, *A. Zeyheri*.

A. barbadensis (Barbadoes). Synonymous with *A. vera*.

A. Barberæ (Barber's). Synonymous with *A. Bainesii*.

A. brevifolia (short-leaved).* *fl.*, perianth red, fifteen to eighteen lines long; raceme dense, 6in. long, 2½in. to 3in. in diameter; pedicels upright, six to twelve lines long; peduncles

simple, hardly 1ft. long. *l.* thirty to forty in a dense rosette, lanceolate, 3in. to 4in. long, and 1in. broad at the base, glaucous, without spots or lines; face unarmed, below swollen or flat; middle three to four lines thick; back convex, sparingly tubercled; marginal teeth whitish, one to one and a half lines long. Stem short, simple. SYN. *A. prolifera.*

A. b. depressa (depressed). *fl.* somewhat larger; peduncles 1½ft. to 2ft. long. *l.* 6in. long; bottom 1½in. to 2in. broad; face sometimes sparingly tubercled.

A. cæsia (bluish-grey).* *fl.*, perianth red, fifteen to sixteen lines long; racemes dense, nearly 1ft. long, 2in. to 3in. in diameter; pedicels twelve to fifteen lines long; scape simple, 6in. *l.* rather dense, lanceolate acuminate, 1ft. to 1½ft.; bottom 2in. to 3in. broad, intensely glaucous, without spot or lines, slightly channelled upwards; middle 3in. to 4in. thick; marginal prickles red, one to one and a half lines long. Stem simple, finally, in old specimens, 12ft. to 14ft. 1815.

A. Candollei (De Candolle's). A mere form of *A. humilis.*

A. chinensis (Chinese). *fl.*, perianth yellow, 1in. long; raceme loose, simple, 6in. to 8in. long, and 2in. broad; pedicels one and a half to two

lines long; peduncle simple, 6in. to 12in. *l.* fifteen to twenty in a dense rosette, ensiform, 9in. to 12in. long, 1½in. broad at the bottom, pale green, not lined; base nearly flat; middle three to four lines thick; upper surface channelled; marginal prickles distant, pale, one to one and a half lines long. Stem short, simple. China, 1817.

A. ciliata (ciliated).* *fl.*, perianth brilliant red, twelve to fifteen lines long; raceme simple, loose, 2in. to 4in. long; pedicels three to four lines long; peduncles slender, simple. *l.* linear, widely spreading, amplexicaul, green, 4in. to 6in. long; base six to nine lines broad, slowly narrowing towards the apex, without spots or lines; middle one line thick; marginal teeth minute, white. Stems long, sarmentose; branches three to four lines in diameter; internodes six to twelve lines long, obscurely striated with green. 1826.

A. Commelyni (Commelin's). A mere form of *A. mitræformis*.

A. consobrina (related). *fl.*, perianth yellowish red, twelve to fifteen lines long; raceme rather loose, oblong, cylindrical, 3in. to 4in. long, and 2in. in diameter; pedicels three to four lines long; scape 1½ft., slender, branched. *l.* loosely disposed, ensiform, 6in. to 8in. long, and 1in.

broad, green, spotted white; face channelled; middle three lines thick; marginal prickles minute, brownish; rosette 10in. to 12in. (sometimes 2ft.) in diameter; upper leaves ascending; central ones spreading half open; lower ones deflexed. Stem 2ft., simple, 1in. in diameter. South Africa, 1845.

A. Cooperi (Cooper's).* *fl.*, perianth fifteen to eighteen lines long; raceme close, 3in. to 6in. long, and 3in. to 4in. in diameter; lower pedicels 1in. to 2in. long; scape simple, 1½ft. to 2ft. *l.* when mature, 8in. to 10in. long, distichous, falcate, lined; outer ones 1½ft. to 2ft., above the base six to eight lines broad, greenish, deeply channelled, sparingly spotted; middle one and a half to two lines thick; marginal teeth minute, close, white. Plant stemless. Natal, 1862. SYN. *A. Schmidtiana*.

A. dichotoma (two-branched).* Quiver-tree. *fl.*, perianth oblong, ten to twelve lines long; raceme loose, 2in. to 4in. long, and 2in. in diameter; pedicels three to four lines long; peduncles stout, branched. *l.* closely packed, at the top of the branch, lanceolate, 8in. to 12in. long; bottom twelve to fifteen lines broad, glaucous, without spots or lines, slightly channelled above the base; middle three to four lines

thick, narrow-margined with white; marginal prickles minute, pale. Trunk short, sometimes 3ft. to 4ft. in diameter. *h.* 20ft. to 30ft. 1781. Arborescent, branched.

A. distans (distant).* *fl.*, perianth pale red, fifteen to eighteen lines long; raceme densely capitate, 3in. to 4in. in diameter; lower pedicels twelve to fifteen lines long; peduncles 1½ft., usually simple. *l.* ascending, loosely disposed, ovate-lanceolate, 3in. to 5in. long, and 1½in. to 2in. broad, green, slightly glaucous, without spots and lines; face concave; middle three to four lines thick; back sparingly tubercled; marginal prickles close, white, horny, one to one and a half lines long. Stem short, simple, 1in. in diameter; internodes pale, striated green. 1732.

A. glauca (milky-green).* *fl.*, perianth pale red, fifteen to sixteen lines long; peduncles simple, 1ft. to 1½ft. long, 3½in. to 4in. in diameter; pedicels 1in. to 1½in. long. *l.* thirty to forty in a dense rosette, lanceolate, 6in. to 8in. long; at the base 1½in. to 2in. broad, slowly narrowing towards the apex, intensely glaucous, spotless, obscurely lined; middle three to four lines thick; face above the base slightly concave; back tubercled at

apex; marginal teeth spreading, brownish, one to one and a half lines long. Stem simple, at length, about 1ft., 1½in. to 2in. in diameter. 1731.

A. gracilis (graceful). *fl.*, perianth yellow, straight, fourteen to sixteen lines long; raceme densely packed, simple, 2in. to 3in.; pedicels three to four lines long; peduncle simple, 6in. to 9in. long, two-edged at the base. *l.* loosely disposed, spreading, 6in. to 10in. long; base ten to twelve lines broad, ensiform, acuminated, glaucous, spotless and without lines; face slightly channelled; back rounded; marginal prickles close, minute. Stem leafy, simple. 1822.

A. Greenii (Green's).* *fl.*, perianth pale red, fourteen to fifteen lines long; raceme oblong, 4in. to 8in. long, and 3in. in diameter; lower pedicels five to six lines long; scape 2ft. long. *l.* in a dense rosette, lanceolate, 15in. to 18in. long; bottom 2½in. to 3in. broad, slowly narrowing from middle to the apex; middle three to four lines thick; face flat, shining green, obscurely lined and spotted white; marginal prickles spreading, one and a half to two lines long, horny. Stem short, simple, 1½in. in diameter. South Africa, 1875.

A. Hanburyana (Hanbury's). Synonymous with *A. albocincta*.

A. humilis (humble).* *fl.*, perianth brilliant red, eighteen lines long; raceme loose, simple, 6in. long, and 2in. to 2½in. in diameter; pedicels nine to twelve lines long; peduncles about 1ft. *l.* thirty to forty in a dense rosette, ascending, lanceolate, acuminate, 3in. to 4in. long, six to eight lines broad, glaucous green, obscurely lined; face slightly concave above, sparingly tubercled; middle three lines thick; back convex; marginal prickles pale, one line long. Plant stemless. 1731.

A. h. acuminata (taper-pointed). *l.* ovate-lanceolate, 4in. to 5in. long, fifteen to eighteen lines broad; marginal prickles pale, two to two and a half lines long. *A. incurva*, *A. suberecta*, and *A. subtuberculata*, of Haworth; *A. Candollei*, and *A. macilenta*, of Baker, are mere forms of the foregoing species.

A. incurva (incurved). A mere form of *A. humilis*.

A. latifolia (broad-leaved).* *fl.*, perianth brilliant golden scarlet, fifteen to eighteen lines long; raceme dense, corymbose, terminal, 4in. to 5in. long and wide; lower pedicels 1½in. to 2in. long; peduncle robust, 2ft., often branched. *l.* twelve to twenty in a dense rosette, ovate-lanceolate, 6in. long, 2½in. to 3½in. broad at bottom, slowly narrowing

from below the middle upwards, green, not lined, but copiously spotted white; middle three to four lines thick; marginal prickles one and a half to two lines long, horny, brownish. Stem at length, 1ft. to 2ft., 1½in. to 2in. in diameter, simple. 1795.

A. lineata (line-marked).* *fl.*, perianth red, fifteen to eighteen lines long; raceme dense, 6in.; pedicels hardly perpendicular, fifteen to eighteen lines long; scape simple, 1ft. *l.* in a dense rosette, lanceolate, 6in. long, 2in. broad at base, narrowing slowly from thence to the apex, pale green, spotless, lined; middle three lines thick, channelled upwards on both sides, unarmed; marginal teeth numerous, red, one and a half to two lines long. Stem finally 6in. to 1ft., simple, 2in. in diameter. 1789.

A. macilenta (thin). A mere form of *A. humilis*.

A. macracantha (long-spined). *fl.* unknown. *l.* fifteen to twenty in a dense rosette, lanceolate, 15in. to 20in. long, and 3in. to 4in. broad at the bottom, slightly narrowed from middle to apex; middle four lines thick; face flat, green, obscurely lined, spotted; marginal prickles horny, three to four lines long. Stem simple, 2ft. to 3ft., 1½in. to 2in. in

diameter. South Africa, 1862.

A. macrocarpa (large-fruited).* *fl.*, perianth club-shaped, brilliant red, fifteen to sixteen lines long; raceme loose, terminal, 6in. long, and 2½in. to 3in. in diameter; lower pedicels ½in. long; peduncles 2ft. *l.* twelve to twenty in a dense rosette, ovate-lanceolate, less than 1ft. long; bottom 3in. to 4in. broad; top channelled; middle three to four lines thick, green, copiously spotted; marginal prickles spreading, half line long. Stem short, simple. Abyssinia, 1870.

A. maculata (spotted). Synonymous with *A. abyssinica*.

A. margaritifera (pearl-bearing). *See* **Haworthia margaritifera**.

A. mitræformis (mitre-shaped).* *fl.*, perianth brilliant red, eighteen to twenty-one lines long; raceme dense, corymbose, 4in. to 6in. long, and nearly as much in diameter; pedicels ascending; lower ones fifteen to eighteen lines long; peduncles strong, 1½ft., sometimes branched. *l.* rather loosely disposed, ascending, lanceolate, about 1ft. long, 2in. to 3in. broad; green, slightly glaucous, without spots or lines; face concave; middle three to four lines thick; back convex, sparingly tubercled; apex horny, pungent; marginal prickles rather close, pale, one to one and a

half lines long. Stem finally 3ft. to 4ft., simple, 1in. to 2in. in diameter.

A. m. flavispina (yellow-spined). Differs from the type in having narrower and more lanceolate leaves, and yellow spines. *A. Commelyni*, *A. spinulosa*, *A. pachyphylla*, and *A. xanthacantha*, are also forms of this species.

A. myriacantha (many-spined). *fl.*, perianth pale red, eight to nine lines long; racemes densely capitate, 2in. in diameter; pedicels four to six lines long; peduncles slender, simple, 1ft. *l.* ten to twelve, falcate, linear, 5in. to 6in. long, four to five lines broad, green, glaucous; face deeply channelled; back convex, spotted white; marginal teeth numerous, white. Plant stemless. 1823.

A. nobilis (noble).* *fl.*, perianth red, fifteen to eighteen lines long; raceme dense, 6 or more inches long, 4in. broad; lower pedicels 1½in. to 2in. long; peduncles simple, 1½ft. *l.* rather loosely disposed, lanceolate, 9in. to 12in. long, 2¼in. to 4in. broad; face green, without spots or lines, concave above the base; middle three to four lines thick; apex rather pungent; back prickly upwards; marginal prickles rather close, one and a half to two lines long, horny. Stem simple, at length 3ft. to 4ft. high, 1½in. to 2in. in

diameter. 1800.

A. pachyphylla (thick-leaved). A mere form of *A. mitræformis*.

A. paniculata (panicled). Synonymous with *A. albocincta*.

A. Perryi (Perry's).* *fl.*, perianth greenish, nine to ten lines long; raceme dense, 3in. to 4in. long; pedicels three to four lines long; inflorescence 1½ft. long, commonly two-headed. *l.* in a rosette, lanceolate, 7in. to 8in. long, and 2½in. broad, from below the middle to the apex narrowed, pale glaucous green, spotless, obscurely lined, channelled above the base; middle three to four lines thick; marginal teeth close, horny, one line long. Stem simple, 1in. in diameter. Socotra, 1879.

A. prolifera (proliferous). Synonymous with *A. brevifolia*.

A. purpurascens (purplish). *fl.*, perianth reddish, twelve to fifteen lines long; raceme dense, 6in. to 9in. long, and about 3in. in diameter; pedicels nine to twelve lines long; scape strong, simple, 1½ft. to 2ft. *l.* forty to fifty in a dense rosette, 1ft. to 1½ft. long, ensiform, 2in. broad at the base, slowly narrowed towards the apex, green; base flat; middle three lines thick, slightly channelled upwards, sometimes

spotted; marginal prickles small, white. Stem 2ft. to 3ft., sometimes forked. 1789.

A. rhodocincta (red-margined), of gardens, is probably a form of *A. albocincta*.

A. saponaria (soapy).* *fl.*, perianth brilliant red, eighteen to twenty-one lines long; raceme dense, corymbose, 3in. to 4in. long and wide; lower pedicels 1½in. to 2in. long; scape 1ft. to 2ft., simple, or sparingly branched. *l.* twelve to twenty in a dense rosette, lanceolate, 9in. to 12in. long, eighteen to twenty-four lines broad, narrowed from below the middle upwards; middle three to four lines broad; face flat at bottom; back swollen, green, copiously spotted, distinctly lined; marginal prickles adjoining, horny, one and a half to two lines long. Stem short, simple, 1½in. to 2in. in diameter. 1727.

A. Schimperi (Schimper's).* *fl.*, perianth bright red, eighteen to twenty-one lines long; racemes densely corymbose, 4in. in diameter; pedicels twelve to fifteen lines long; scape strong, 3ft. long, strongly branched above. *l.* twenty in a dense rosette, oblong-lanceolate, about 1ft. long, 4in. broad, glaucous green, lined, sometimes spotted, three to four lines thick at middle, above

which they are channelled; teeth minute, spreading. Stem short, simple. Abyssinia, 1876.

A. Schmidtiana (Schmidt's). Synonymous with *A. Cooperi*.

A. serra (saw). *fl.*, perianth brilliant red, eighteen lines long; raceme simple, dense, 6in. long or more, 3in. to 4in. in diameter; pedicels six to twelve lines long; scape simple, 1½ft. to 2ft. *l.* thirty to forty in a dense rosette, lanceolate, 3in. to 5in. long, twelve to eighteen lines broad below, without spots and lines; base swollen, concave towards the apex; middle three to four lines thick, sparingly tubercled; marginal prickles close, one to one and a half lines long. Plant shortly stemmed. 1818.

A. serratula (finely-toothed).* *fl.*, perianth red, fifteen to eighteen lines long; raceme rather dense, 6in. long; pedicels six to nine lines long; peduncles simple, about 1ft. *l.* twelve to twenty in a dense rosette, lanceolate, 6in. to 9in. long; bottom 1½in. to 2¼in. broad, pale green; face below the top flat or slightly concave, obscurely lined, spotted; margin minutely denticulated. Stem simple, finally 1ft. to 2ft. high, 1½in. to 2in. in diameter. 1789.

A. spinulosa (spiny). A mere form of *A. mitræformis*.

A. striata (striated). Synonymous with *A. albocincta*.

A. striatula (slightly striped).* *fl.*, perianth yellow, twelve to fifteen lines long; raceme oblong, rather dense, simple, 3in. to 6in. long, and 2in. in diameter; pedicels short; peduncles simple, nearly 1ft. *l.* linear, spreading, green, 6in. to 9in. long; base not dilated, six to eight lines broad, above the base upwards narrowed, slightly channelled; middle one line thick; marginal prickles deltoid. Stem long, sarmentose; floral branches three to six lines in diameter; internodes 6in. to 12in. long. 1823.

A. suberecta (slightly erect). A mere form of *A. humilis*.

A. subtuberculata (slightly knobbed). A mere form of *A. humilis*.

A. succotrina (Socotrine).* *fl.*, perianth reddish, fifteen lines long; raceme dense, about 1ft. long, 2½in. to 3in. in diameter; lower pedicels nine to twelve lines long; peduncles simple, 1½ft. *l.* thirty to forty in a dense rosette, ensiform, acuminate, falcate, 1½ft. to 2ft. long; base 2in.; middle 1in. broad, green, slightly glaucous, sometimes spotted, slightly channelled upwards; marginal prickles pale, one line long. Stem 3ft. to 5ft., often forked. Isle of Socotra. 1731.

A. tenuior (thinned). *fl.*, perianth pale yellow, five to six lines long; racemes rather loose, simple, oblong, nearly 1ft. 2in. in diameter; pedicels three to four lines long; peduncles slender, simple, 4in. to 8in. *l.* loose, linear, 5in. to 8in. long, slowly narrowing from middle towards apex, green, spotless, slightly channelled; middle one line thick; marginal prickles minute, pale. Stem long, sarmentose. 1821.

A. tricolor (three-coloured).* *fl.*, perianth coral red, fleshy; raceme loose, oblong, 3in. to 4in. long, and 2in. broad; pedicels ascending, three to four lines long; scape 1½ft. long, glaucous purple; panicle deltoid. *l.* twelve to sixteen in a close rosette, lanceolate, 5in. to 6in. long, 1½in. to 2in. broad at bottom, slowly narrowing from below the middle to apex; middle five to six lines thick; back rounded; face slightly swollen, copiously spotted, not lined; marginal prickles close, spreading, about one line long. Stem short, simple. South Africa, 1875.

A. variegata (variegated).* *fl.*, perianth reddish, fifteen to sixteen lines long; raceme simple, loose, 3in. to 4in. long and about 3in. in diameter; pedicels three to four lines long; scape simple, tapering, 6in. to 8in. *l.* close, erecto-patent,

lanceolate, 4in. to 5in. long, 1in. broad; face concave; back keeled, bright green, copiously spotted grey on both sides; margin whitish, denticulated. 1790. This is the variegated Aloe so frequently seen in cottage windows.



Fig. 61. Aloe vera.

A. vera (true).* *fl.*, perianth yellow, cylindrical, ¾in. to 1in. long; raceme dense, 6in. to 12in. long; scape

strong, 2ft. to 3ft. long, simple or branched. *l.* ensiform, dense, aggregate, 2in. to 4in. broad, narrowing from the base to apex, pale green; middle about ½in. thick; face channelled above the base; marginal prickles subdistant, deltoid, horny. Stem rarely more than 1ft. or 2ft. 1596. SYNS. *A. barbadensis*, *A. vulgaris*. See Fig. 61.

A. vulgaris (common). Synonymous with *A. vera*.

A. xanthacantha (yellow-spined). A mere form of *A. mitræformis*.

A. Zeyheri (Zeyher's). A garden synonym of *A. Bainesii*.

ALOMIA (from *a*, not, and *loma*, a fringe). ORD. *Compositæ*. Allied to *Eupatoria*. An ornamental half-hardy evergreen plant. Grows freely in sandy loam, and may be propagated by cuttings.

A. ageratoides (ageratum-like). *fl.-heads* white, many flowered; involucrum campanulate, imbricate; scales narrow, acute; receptacle naked, convex. July. *l.* opposite, or upper ones alternate, petiolate, denticulated. *h.* 1½ft. New Spain, 1824.

ALONA (primitive name, *Nolana*—letters transposed; from *nola*, a little bell, in allusion to the shape of the flowers). ORD. *Nolanaceæ*. A genus of pretty evergreen shrubs closely allied to *Nolana*, but

differing principally in having several ovaries from one to six-celled, whereas *Nolana* has five four-celled ovaries. Leaves fasciculate; stems woody. They require ordinary greenhouse treatment, in a peat and loam compost. Cuttings root freely in sandy loam, with a very gentle bottom heat, in about a fortnight.

A. cœlestis (sky-blue).* *fl.* pale blue, very large, axillary, solitary; peduncle elongated. July. *l.* terete, fascicled; plant nearly glabrous. *h.* 2ft. Chili, 1843. This pretty species is an excellent one for growing out-of-doors during summer months.

ALONSOA (in honour of Z. Alonso, formerly Spanish secretary for Santa Fe de Bogota). ORD. *Scrophularineæ*. A genus of very pretty little half-hardy shrubs, herbaceous perennials, or annuals, with axillary, sub-racemose flowers, which are resupinate, with a sub-rotate five-cleft limb. Leaves opposite, or ternately whorled. They will grow freely in light rich soil; and are readily increased by cuttings in August or March, which should be placed in sandy soil in gentle heat, or by seeds sown in March. The herbaceous species may be treated as outdoor summer annuals, and should be raised in a little heat, and planted out early in May.

A. albiflora (white-flowered).* *fl.* pure white, with yellow eye, in long terminal spikes. *h.* 1½ft. to 2ft. Mexico, 1877. This is recommended for pot culture, as in the conservatory it will provide a succession of flowers throughout the autumn and winter.

A. caulialata (wing-stemmed). *fl.* scarlet, racemose. June. *l.* ovate, acute, serrated. Stems and branches quadrangular, winged. *h.* 1ft. Peru, 1823. Half-hardy, herbaceous.

A. incisifolia (cut-leaved).* *fl.* scarlet; peduncles long, alternate, disposed in terminal racemes. May to October. *l.* opposite, ovate, acute, deeply toothed, or serrate. *h.* 1ft. to 2ft. Chili, 1795. Glabrous greenhouse shrub. SYN. *Hemimeris urticifolia*.

A. linearis (linear-leaved). *fl.* scarlet, with a dark bottom, like most of the species. May to October. *l.* opposite, or three in a whorl, linear, entire or remotely denticulated; young leaves fascicled in the axils of the old ones. *h.* 1ft. to 2ft. Peru, 1790. Greenhouse shrub. SYN. *Hemimeris coccinea*.

A. linifolia (flax-leaved).* *fl.* scarlet. *h.* 1ft. to 1½ft. New Holland. This is an elegant little annual, forming symmetrical, graceful, and very free flowering plants, either for pot or outdoor culture.

A. Matthewsii (Matthew's). *fl.* scarlet, in loose, terminal racemes. July. *l.* lanceolate, toothed, about 1in. long. Stem slender, quadrangular. *h.* 1ft. Peru, 1871. Greenhouse shrub.

A. myrtifolia (myrtle-leaved). *fl.* scarlet, very large. New and pretty species.

A. Warscewiczii (Warscewicz's).* *fl.* rosy scarlet. *h.* 1½ft. Chili, 1858. This is probably a herbaceous variety of *A. incisifolia*, and one of the best annuals.

ALOYSIA (in honour of Maria Louisa, mother of Ferdinand VII., King of Spain). Sweet-scented Verbena. ORD. *Verbenaceæ*. This genus is nearly allied to *Verbena*, which *see* for generic characters. A greenhouse deciduous shrub, with a very fine perfume and graceful habit. The most satisfactory plan of culture is to obtain well-grown thrifty young plants in spring, and grow them on for the season. As the wood ripens, give less water until they are at rest, when it must be nearly withheld. About the end of January, bring into the light and warmth, and water thoroughly. As soon as the plants break, cut back to three or four eyes; and when the young shoots are about an inch long, transfer into rich sandy soil, using pots a size or two smaller than those they were in before. When the pots are full of roots, transfer to those that are to hold the plants for the season. By this mode of culture, good plants are to be maintained for any length of time. Aloysias form excellent pillar subjects for either a cold greenhouse, or out-of-doors, in which latter situation they thrive remarkably well, but require thorough protection, with straw bands or mats, from November until March, and afterwards at night, until danger from severe frosts has passed. They require no summer training, their young growth being continually cut off for the many purposes of

decoration to which they are applied, and to which they are so well adapted. They are easily increased by young cuttings in spring, which should be placed in sandy soil and gentle heat, when they will root in about three weeks.

A. citriodora (lemon-scented).* *fl.* whitish or lilac, very small, in terminal panicles. August. *l.* pale green, lanceolate, agreeably scented, arranged in whorls of threes; branches slender. Chili, 1781. SYNS. *Lippia citriodora*, *Verbena triphylla*.

ALPINE GARDEN. A very interesting style of gardening, which succeeds best by imitating Nature as closely as possible. The situation may be an open or a sheltered one. In building a Rock or Alpine Garden, it should be so arranged that all aspects are secured—shady and sunny—fully or in degree only. Pockets and crevices of various sizes may be made, and filled with soil suitable for the subjects to be planted therein, each one having a direct connection with the bulk of the soil; and the constructing material should be arranged with a gentle fall, so that moisture drains towards rather than from the roots. Alpine plants, as a rule, flourish better on a properly constructed rockery than if placed in any other position, because thorough drainage is effected, and the long and fine roots can run down in the crevices, where the soil is cool and moist. Although most alpine plants are naturally exposed to the full action of sun and wind, they should be placed out in early autumn, or early spring, so as to become thoroughly established before the approach of scorching summer weather. Failing materials

necessary for the construction of a rockery, many alpines are easily grown in the ordinary border, in a naturally or artificially well drained situation. Excavate to the depth of 18in., put in a layer of stones, broken bricks, &c., 6in. deep; fill up with rich fibrous loam and leaf mould, adding sufficient sand to keep the soil porous. When the desired subjects are firmly planted, cover the surface with small gravel or stone chippings, which, while allowing the rain to penetrate the soil, effectually checks evaporation, and keeps it moist and cool, as well as giving the appearance of rocky *débris*. The effect will be better if the surface is slightly undulated.

ALPINE ROSE. *See* **Rhododendron ferrugineum**.

ALPINIA (in honour of Prosper Alpinus, an Italian botanist). ORD. *Zingiberaceæ*. A rather large genus of stove herbaceous perennials, with considerable grace and beauty. Flowers disposed in terminal spikes. Leaves lanceolate, smooth, even, entire, sheathed at the base, and having transverse veins. Roots fleshy, branched, having much of the smell and taste of ginger. The soil can hardly be too rich for the successful culture of these plants. A mixture of equal parts loam, peat, leaf mould, or thoroughly rotted hotbed manure, freely mixed with sharp sand or fine charcoal dust, forms an excellent compost. During the growing season, a top dressing of rotten dung, and a frequent application of weak manure water, prove excellent stimulants. They grow rapidly and consume a great deal of food in the production of so much stem and so many leaves. Unless the former is vigorous and of considerable thickness, it will fail to be crowned with spikes of flower. Alpinias require a high temperature, a rich, light soil, abundance of water, and not a little space, to grow them well.

Soon after flowering, the plants will assume the yellow leaf, when water may be gradually withheld; but no attempt should be made to dry them off too severely, even after the stems die down. Nor must they be stored when at rest in a low temperature; in fact, they require as much heat to preserve them in health when resting as at any other time. The best time to divide the plants is after the young shoots have made an inch of growth in spring.

A. albo-lineata (white-lined).* *l.* elliptic lanceolate, pale green, marked with oblique broad bands of white. *h.* 3ft. to 4ft. New Guinea, 1880.

A. mutica (beardless). *fl.* in pairs on a spike-like raceme; calyx white; corolla duplex, consisting of three outer oblong white segments; upper lobe concave and projecting, broad; lip large, bright yellow, veined with crimson; mouth finely crispulate at the edge. Borneo, 1882. A very handsome species.

A. nutans (nodding).* *fl.* pink, sweetly-scented; racemes drooping. May. *l.* lanceolate, smooth, even, entire. *h.* 13ft. India, 1792. This species looks best in considerable masses, even larger than those shown in the illustration, grown in large pots or tubs, or planted out in borders of tropical houses. It should on no account be severely divided. See Fig. 62.



Fig. 62. Alpinia nutans, showing Form of Individual Flower.

A. vittata (striped).* *l.* 6in. to 8in. long, elliptic lanceolate, tapering to a long fine point, and also narrowed gradually towards the sheathing base, pale green, marked by broad stripes of dark green and creamy white, running off from the midrib in divergent lines, corresponding to the venation. South Sea Islands. See Fig. 63, for which we are indebted to Mr. Bull.

ALSIKE. *See* **Trifolium hybridum**.

ALSODEIA (from *alsodes*, leafy; plants thickly beset with leaves). ORD. *Violarieæ*. Ornamental evergreen stove shrubs. Flowers small, whitish, racemose; petals equal; racemes axillary and terminal; pedicels bracteate jointed. Leaves usually alternate, feather-nerved; stipules small, deciduous. They thrive best in a mixture of loam and sand, and young cuttings root readily under a bell glass if planted in sand, in heat.

A. latifolia (broad-leaved).* *fl.* on dense, glabrous racemes. *l.* ovate, obtusely acuminated. *h.* 6ft. Madagascar, 1823.

A. pauciflora (few-flowered). *fl.* few, somewhat corymbose; pedicels reflexed. *l.* wedge-shaped, on short footstalks. *h.* 4ft. Madagascar, 1824.

ALSOPHILA (from *alsos*, a grove, and *phileo*, to love; in reference to the situation which they affect in Nature). ORD. *Filices*. A magnificent genus of tropical and temperate tree ferns. Sori globose, dorsal, on a vein or in the forking of a vein; receptacle mostly elevated, frequently villous; involucre none. The species of this genus require an abundant supply of water, particularly in summer, and the young fronds must be carefully shaded from solar heat. They thrive well in a peat and loam compost. For general culture, *see* **Ferns**.

A. aculeata (prickly).* *fronds* ample, tripinnate. *rachises* brown-stramineous; pinnæ ovate-lanceolate, 1ft. to 1½ft. long; pinnules sessile, ligulate, 3in. to 4in. long, ½in. to

¾in. broad; segments close, ligulate, blunt, denticulate, often less than one line broad; both sides bright green, slightly hairy on the ribs, not scaly. *sori* minute, medial; texture herbaceous. Tropical America; very common. A very effective stove species. SYN. *A. ferox*, &c. See Fig. 64.

A. armata (armed).* *fronds* ample, tripinnatifid or tripinnate. *rachises* stramineous, densely pilose; pinnæ oblong-lanceolate, 1½ft. to 2ft. long; pinnules ligulate-lanceolate, sessile, 3in. to 5in. long, ¾in. to 1in. broad; segments falcate, blunt, one to one and a half lines broad, sub-entire or toothed; both sides densely pilose on the ribs, not scaly. *sori* subcostular. Tropical America; extremely abundant. Stove species.



FIG. 63. ALPINIA VITTATA.

A. aspera (rough).* *cau.* slender, 10ft. to 30ft. high. *sti.* and *rachises* strongly aculeated; main and partial rachis above strigillose, slightly scaly beneath and on the costa, the rest glabrous, often glossy. *fronds* bipinnate; pinnules shortly petiolate, oblong; apex acuminated, pinnatifid half or two-thirds of the way down to the costa; lobes oblong-ovate, often acutely serrulate; costa bearing

small, deciduous, bullate scales beneath. *sori* very deciduous. West Indies, &c. Stove species.

A. australis (southern).* *sti.* with very long, firm, subulate scales, 1½ft. long, and as well as the main rachises, muricato-asperous, stramineous. *fronds* ample, subglaucous beneath, more or less villous on the costæ and costule above, and very minutely bullato-paleaceous beneath, often quite naked, from 6ft. to 30ft. long; primary pinnæ 1½ft. long, 6in. to 10in. wide; pinnules 3in. to 4in. long, ½in. to ¾in. wide, oblong, acuminate, deeply pinnatifid, or towards the base even pinnate; ultimate pinnules or lobes oblong, acute, serrated, subfalcate. *sori* copious, rather small. New Holland, &c., 1833. A very handsome greenhouse species.

A. comosa (hairy). Synonymous with *A. Scottiana*.

A. contaminans (contaminating).* *cau.* slender, growing from 20ft. to 50ft. high. *sti.* and *rachises* purplish brown, glossy, aculeate. *fronds* 6ft. to 10ft. long, ample, glabrous, deep green above, glaucous beneath; primary pinnæ 2ft. or more in length, oblong-ovate, acuminate; pinnules sessile, 4in. to 5in. long, ½in. to 1in. wide, deeply pinnatifid,

linear-oblong, sub-falcate, entire. *sori* nearer the costule than the margin. Java and Malaya. Stove species. SYN. *A. glauca*.

A. Cooperi (Cooper's).* *fronds* ample, tripinnate. *rachises* stramineous, muricated, glabrous beneath; basal scales large, linear, pale, spreading; pinnæ oblong-lanceolate, 1½ft. to 2ft. long; pinnules ligulate, 4in. to 5in. long, ¾in. to 1in. broad, lowest long-stalked; segments ligulate, blunt, toothed, one and a half to two and a half lines broad. *sori* small. Queensland, &c. Greenhouse.

A. excelsa (tall).* *trunk* about 30ft. high. *sti.* and main *rachises* muricated. *fronds* ample, dark green above, paler beneath; primary pinnæ 1½ft. to 2ft. long, 6in. to 10in. wide; pinnules numerous, oblong-lanceolate, acuminated, deeply pinnatifid, often quite pinnate; ultimate divisions ¼in. to ¾in. long, oblong, acute or obtuse, falcate, the margins sub-recurved, serrated. *sori* copious near the costules. Norfolk Island. This rapid-growing and splendid species proves nearly hardy in the neighbourhood of Cornwall; and is a most effective plant for sub-tropical gardening purposes generally. Greenhouse species.

A. ferox (fierce). Synonymous with

A. aculeata.

A. Gardneri (Gardner's). Synonymous with *A. paleolata*.

A. gigantea (gigantic). *cau.* growing from 20ft. to 40ft. high. *sti.* asperous; *fronds*, primary pinnæ 1½ft. to 2ft. and more long, deeply pinnatifid at the apex; pinnules, upper ones sessile, lower ones petiolate, oblong-acuminate, 3in. to 6in. long, five to nine lines wide, deeply pinnatifid; lobes triangular or rounded, serrated. *sori* copious. India, &c. Stove species. SYN. *A. glabra*.

A. glabra (glabrous). Synonymous with *A. gigantea*.

A. glauca (grey). Synonymous with *A. contaminans*.

A. infesta (troublesome). *fronds* ample, tripinnatifid; pinnæ oblong-lanceolate, 1ft. to 1½ft. long; pinnules ligulate, 3in. long, ½in. to 1in. broad, cut down to a narrow wing; segments ⅛in. broad, ligulate, blunt, nearly entire; texture sub-coriaceous; colour deep green on both sides. Tropical America; widely distributed. Stove species.

A. Leichardtiana (Leichardt's).* *cau.* 10ft. to 20ft. high. *sti.* jointed upon the caudex; main and secondary rachises purple, deciduously powdery, spiny. *fronds* 6ft. to 10ft. long, firm, dark green above, sub-

glaucous beneath, naked and glaucous (or nearly so), tripinnate; primary pinnæ 1½ft. to 2ft. long, 8in. wide, oblong-lanceolate, acuminate; pinnules oblong-acuminate, sessile, pinnatifid only at the apex; ultimate divisions linear-oblong, acute, spinulose-serrate. *sori* copious, close to the costa. Australia, 1867. Greenhouse species. SYNS. *A. Macarthurii*, *A. Moorei*.

A. lunulata (moon-shaped pinnuled). *fronds* ample, tripinnate. *rachises* stramineous, glabrous below, densely muricated; pinnæ oblong-lanceolate, 1½ft. to 2ft. long; pinnules close, ligulate, sessile, 4in. to 5in. long, ¾in. to 1in. broad; segments close, ligulate, falcate, blunt, one line broad, obscurely crenulate. *sori* minute. *h.* 25ft. Polynesia. Greenhouse species.

A. Macarthurii (MacArthur's). Synonymous with *A. Leichardtiana*.

A. Moorei (Moore's). Synonymous with *A. Leichardtiana*.

A. paleolata (scaly).* *cau.* slender, 10ft. to 20ft. high. *fronds* ample, tripinnatifid. *rachises* stramineous, smooth, pubescent below; pinnæ oblong-lanceolate, 1½ft. to 2ft. long; pinnules ligulate, sessile or shortly stalked, 3in. to 4in. long, ½in. to ¾in. broad, deeply cut, the segments blunt and nearly entire; texture sub-

coriaceous; colour deep green, both surfaces deeply pilose, the lower scaly on the ribs. *sori* large, medial. Columbia, &c. Stove species. SYN. *A. Gardneri*.

A. procera (tall). *sti.* aculeated and paleaceous below, with large glossy, dark brown scales. *fronds* bipinnate, glabrous, pinnatifid at the apex; primary pinnæ 1ft. or more long, the rachis winged above; pinnules 2in. to 3in. long, oblong-acuminate or obtuse, pinnatifid half way down to the costa; lobes short, sub-rotundate, often acute, mostly entire. *sori* small on all the lobes, between the costule and the margin. Tropical America. Stove species.

A. pruinata (as if hoar-frosted).* *sti.* densely woolly at the base. *fronds* glaucous, bi-tripinnate; primary pinnæ petiolate, 12in. to 18in. long, ovate-lanceolate; pinnules 3in. to 4in. long, 1in. wide, petiolulate, from a broad base, oblong-acuminate, deeply pinnatifid, or again pinnate; ultimate divisions ½in. long, lanceolate, very acute, deeply and sharply serrated. *sori* solitary. Tropical America, extending to Chili. Stove or greenhouse species.

A. radens (rasping). *cau.* 3ft. high, 3in. diameter. *sti.* 2ft. to 3ft. long, clothed with ovate, pale brown

scales. *fronds* 6ft. to 8ft. long, lanceolate-ovate, bipinnatisect; primary segments 1½ft. long, elongato-oblong, acuminate; secondary ones 2in. to 3in. long, petiolulate, linear-lanceolate, pinnati-partite; segments oblong, denticulate. *sori* between the costule and the margin. Brazil. Stove species.

A. Rebeccæ (Rebecca's).* *cau.* slender, 8ft. high. *fronds* ample, bipinnate; pinnules twenty to thirty on each side, the lower ones stalked, linear, 2in. to 3in. long, more or less inciso-crenate, apex acuminate. *sori* principally in two rows between the midrib and edge. Queensland. Greenhouse species. See Fig. 65, for which we are indebted to Mr. Bull.

A. sagittifolia (arrow-leaved).* *fronds* oblong-deltoid, 4ft. to 6ft. long, bipinnate. *rachises* stramineous, muricated; pinnæ lanceolate, ¾ft. to 1ft. long, the lower shorter, deflexed; pinnules sessile, ligulate, crenulate, cordate on both sides at the base, 1in. to 1½in. long, nearly ¼in. broad. *sori* large. Trinidad, 1872. Very handsome and distinct stove species.



FIG. 64. ALSOPHILA ACULEATA.

A. Scottiana (Scott's).* *fronds* ample, tripinnatifid. *rachises* castaneous, naked and smooth beneath; pinnæ oblong-lanceolate, 1½ft. to 2ft. long; pinnules sessile, 3in. to 4in. long, about ½in. broad, ligulate, cut down to a narrow wing on the rachis; segments ligulate, blunt, dentate, sub-falcate, not ⅛in. broad. *sori* sub-costular. Sikkim, 1872. Greenhouse species. SYN. *A. comosa.*

A. Tænitis (Tænitis-like).* *fronds* 3ft. to 6ft. long, bipinnate; pinnules distant, 3in. to 5in. long, lanceolate, acuminate, glabrous, sub-entire,

petioled; petiole articulated on the rachis. *sori* in a single series, equidistant between the costa and the margin, mixed with long, copious hairs. Brazil. An elegant stove species.

A. villosa (villous).* *cau.* 6ft. to 12ft. high. *sti.* 1ft. or more long, tubercular, densely clothed at the base with ferruginous scales. *fronds* from 6ft. to 8ft. long, bi- or sub-tripinnate, broadly lanceolate in outline; pinnules 1in. to 3in. long, oblong-lanceolate, obtusely acuminate, deeply pinnatifid; lobes oblong, obtuse, entire or coarsely serrated. *sori* copious. Tropical America. A very beautiful stove species.

ALSTONIA (in honour of Dr. Alston, once Professor of Botany at Edinburgh). ORD. *Apocynaceæ*. Usually tall, lactescent, or milk-bearing stove evergreen shrubs or trees, with small white flowers, which are disposed in terminal cymes. Leaves entire, opposite or often whorled. Of easy culture, thriving best in a mixture of peat, loam, and sand. Cuttings root readily in sand, in heat. Besides the one mentioned, there are eleven other species.

A. scholaris (school). *fl.*, corolla salver-shaped, white; cymes on short peduncles. March to May. *l.* five to seven in a whorl, obovate-oblong, obtuse, ribbed; upper surface glossy, under white, and having the veins

approximating the margin. *h.* 8ft. India, 1803. SYN. *Echites scholaris*.



FIG. 65. ALSOPHILA REBECCÆ.

ALSTRÖMERIA (in honour of Baron Alströmer, a Swedish botanist and friend of Linnæus). ORD. *Amaryllidaceæ*. Tall handsome hardy or half-hardy tuberous rooted plants, with leafy stems and terminal umbels of richly-coloured flowers; perianth regular, six-parted, subcampanulate; inner segments narrower, two of which are somewhat tubulose at the base; stamens included within, and inserted with perianth; stigma trifid. Leaves linear, lanceolate, or ovate, and resupinate, or inverted in position by the twisting of the petiole. Cultivation: Few plants need less attention to grow them successfully, either in pots or planted out. The best position for those kinds which succeed outside is a deep and dry, sloping, sheltered border, in a compost of two-parts peat and leaf soil, and one loam with some sharp sand. Water freely if severe drought sets in; a surface covering of

common moss, or cut fern in winter, will prove an advantage. They are very effective in masses. Propagation: They may be increased by seed or root division. Sow the former when ripe, or in early spring, thinly in pans, pots, or boxes, and place in a cool house or frame, so that they will receive some fostering in their early stages. The seedlings should be pricked out singly, when large enough to handle, and grown on till well established under glass. A mixture of peat, leaf mould, and sandy loam, is the best compost in which to sow the seeds and grow the young plants. When sufficiently established, they may be placed in a warm sheltered spot outside, and about 1ft. apart. The fasciculated masses of fleshy roots are readily separated into as many pieces as there are crowns; this operation may be performed during September or October, or February and March; but it must be done carefully. Except for the sake of increase, the less they are disturbed the better. They are excellent subjects for pot culture (some can only be managed thus, unless planted out in a house), and may be potted as early in the autumn as possible, in 8in., 10in., or 12in. pots. Thorough drainage is essential; arrange the crocks carefully, and place a layer of thin turfy loam over them. A compost of equal parts turfy loam, leaf mold, and fibrous peat, with an abundance of sand, will suit them admirably. Water sparingly at first, but when root-action is fully resumed, they must never be allowed to get dry. Support the stems by staking when they require it, and just previous to flowering, top-dress with some rotten manure and leaf soil. Occasional syringings will be necessary to keep down red spider, especially if the atmosphere is very dry. As the plants finish flowering, and the leaves fade, gradually diminish the supply of water until the

stems are quite down, when they may be placed somewhere out of the way, free from frost, for the winter, but not kept dry enough to make them shrivel. In repotting, as much of the old soil as is practicable should be removed, without seriously disturbing the roots, and the plants shifted into larger or the same sized pots, according to their condition. Alströmerias were at one time much more largely grown than they are at present, and the genus was represented in nearly every garden.



Fig. 66. Alströmeria aurantiaca, showing Habit and Flower.

A. aurantiaca (golden).* *fl.* orange; two upper perianth segments lanceolate, streaked with red; arranged in a five to six stalked umbel, bearing ten to fifteen blooms.

Summer and autumn. *l.* numerous, linear-elliptical, obtuse, glaucous, twisted and turned back at the base, about 4½in. long. *h.* 3ft. to 4ft. Chili, 1831. A variable but very showy species, quite hardy. See Fig. 66.

A. caryophyllæa (clove-like scent).* *fl.* scarlet; very fragrant, perianth two-lipped; peduncles longer than the involucre. February and March. *l.* spathulate-oblong. Stem erect. *h.* 8in. to 12in. Brazil, 1776. This stove species requires perfect rest in winter. SYN. *A. Ligtu*.



Fig. 67. Flower of Alströmeria Pelegrina.

A. chilensis (Chilian).* *fl.* blood-red or pink, large, the two upper interior petals longer and narrower, variegated with yellow lines; in pairs on a five to six stalked umbel. Summer and autumn. *l.* scattered, obovate, spathulate; upper ones lanceolate, twisted at the base, minutely fringed on the edges, glaucescent. *h.* 2ft. to 3ft. Chili, 1849. Hardy. There are many

varieties of this species, varying in colour from a rosy white to a deep orange or red.

A. densiflora (thickly-flowered).* *fl.*, perianth scarlet, dotted with black spots inside towards the base; umbels many-flowered, dense; pedicels pubescent, rarely bracteated. *l.* alternate, ovate, shortly acuminate, pubescent underneath. Stem climbing, glabrous. Peru, 1865. Tender species.

A. Flos Martini (St. Martin's flower). Synonymous with *A. pulchra*.

A. Hookeri (Hooker's). Synonymous with *A. Simsii*.

A. Ligtu (Ligtu). Synonymous with *A. caryophyllæa*.

A. Pelegrina (the native name).* *fl.* white, or pale yellow, striped with rose, and yellow spot on each segment; pedicels one-flowered, on a six or more stalked umbel. Summer. *l.* lanceolate, twisted at the base. *h.* 1ft. Chili, 1754. Rather tender. See Fig. 67.

A. p. alba (white).* Lily of the Incas. *fl.* white. Perhaps this is the most chaste of all the Alströmerias, and more tender than many others; it should have a specially warm spot, or the protection of glass. 1877.

A. peruviana (Peruvian). Synonymous with *A. versicolor*.

A. psittacina (parrot-like).* *fl.* bright crimson at the base, greenish upwards, spotted with purple; upper perianth segments slightly hooded, hence the specific name; umbels many-flowered; peduncles angular. September. *l.* oblong-lanceolate, acute, twisted at the base. Stem erect, spotted. *h.* 6ft. Mexico, 1829. Hardy.

A. p. Erembaulti (Erembault's). *fl.* white, spotted with purple. August. *h.* 2ft. 1833. A beautiful but rather tender hybrid.

A. pulchella (pretty). Synonymous with *A. Simsii*.

A. pulchra (fair).* St. Martin's Flower. *fl.* in umbels of from four to eight in each; the lower perianth segments purplish outside, and edges of a sulphur-white; the upper part of the upper segments of a fine yellow, dotted with deep red spots, the lower part of a flesh colour; pedicels twisted. *l.* linear lanceolate. Stem erect. *h.* 1ft. Chili, 1822. A beautiful species, but one requiring protection. SYNS. *A. Flos Martini*, *A. tricolor*.

A. rosea (rosy). A synonym of *A. Simsii*.

A. Simsii (Sims's).* *fl.* brilliant

yellow, with red streaks, very showy; umbels many-flowered; peduncles two-flowered. June. *l.* spathulate, ciliated. Stem weak. *h.* 3ft. Chili, 1822. Tender species. SYNS. *A. Hookeri*, *A. pulchella*, *A. rosea*.

A. tricolor (three-coloured). A synonym of *A. pulchra*.



FIG. 68. ALSTRÖMERIA VERSICOLOR, showing Habit and Flower.

A. versicolor (various coloured).* *fl.* yellow, with purple marks; lowest segment the broadest; umbel of usually three shortly-stalked blooms, very floriferous. Late summer. *l.* linear-lanceolate, sessile, scattered. *h.* 2ft. to 4ft. Peru, 1831. This is a very robust species, with several

beautiful varieties, which are both easily obtained and very cheap. SYN. *A. peruviana*. See Fig. 68.

A. v. niveo-marginata (snowy-margined).* *fl.* rose, crimson and white, with green tips and black spots. *l.* lanceolate, stalked, white-edged. 1875. A charming but scarce variety.

ALTERNANTHERA (in allusion to the anthers being alternately barren). ORD. *Amaranthaceæ*. Well known ornamental-leaved half-hardy plants, with inconspicuous flowers in axillary heads. Some of the undermentioned species and varieties belong, technically speaking, to *Telanthera*, in which genus the five stamens are inseparate below, and alternate with as many sterile filaments. They are so universally known in gardening under the present generic name, that we have here included them for convenience' sake. Where Alternantheras are used in large quantities (and if they are to be used effectively, a considerable number must be provided), their economical propagation becomes a matter of importance. A good colour can only be secured by growing them in some house or pit in the full light and warmth of the sun; for, unless so grown, green or badly coloured plants will be the result. The best and quickest way of producing this class of plants in large quantities, is to make up a special hotbed for them about the end of March or beginning of April. If a pit be used, it should be filled up within 6in. of the glass with leaves and manure, or any other material that will produce a steady bottom heat of 80deg. or 85deg., and will last for three weeks or so at that point; which, at this season,

will be an easy matter. When the heat has become regular and steady, about 4in. or 5in. of light, rich, sandy soil should be placed all over the surface, adding, at the same time, a sprinkling of silver sand on the top, and pressing it moderately firm with a flat board. The cuttings may now be prepared and dibbled in, 1in. apart each way. If kept close, moist, and shaded from bright sunshine, in a few days they will be forming roots, and so soon as that takes place the shading should be discontinued, and the ventilation gradually increased until they are finally hardened off and planted out. If carefully lifted, and placed in trays or baskets, with a rhubarb leaf over them, they may be taken any distance, and planted without flagging; with this advantage—that the plants being in good colour, the beds are effective at once. April is early enough to commence striking them, and these will be fit to plant out by the middle of June. The several species quoted in various dictionaries hitherto are unknown in English gardens.

A. amabilis (lovely).* *l.* elliptic, acuminate, greenish in some stages, with the principal ribs stained with red, but under free growth becoming almost entirely suffused with rose colour, mixed with orange, the midribs continuing to be of a deep red hue. Brazil, 1868.

A. a. amœna (charming).* *l.* small, spathulate, orange red and purple in colour, which is shaded with deep green and bronze. Brazil, 1865. A most elegant little plant, with a spreading habit.

A. a. tricolor (three-coloured).* *l.* broadly ovate, glabrous, dark green at the edge, and have a centre of vivid rose, traversed by purple veins, an irregular band of orange yellow intervening between the centre and margin. Brazil, 1862.

A. Bettzichiana (Bettzich's). *l.* olive and red. Brazil, 1862.

A. B. spathulata (spathulate-leaved). *l.* spathulate, but more elongated than the others; the principal colours are reddish pink and light brown; these are shaded with bronze and green. Brazil, 1865. A rather tall species.

A. ficoidea (fig-like).* *l.* variegated with green, rose, and red. India, 1865.

A. paronychioides (Paronychia-like).* *l.* narrow, spathulate, ground colour deep orange red, beautifully shaded with olive green. Dense and compact grower, forming a little clump about 4in. high.

A. p. magnifica (magnificent).* A very fine variety, with a much higher colour than the type.

A. p. major (greater).* *l.* bronze, with rich orange tips; very effective.

A. p. m. aurea (greater-golden).* *l.* bright golden yellow, which colour they retain all through the season.

A. versicolor (various-colour).* *l.* medium sized, ovate, bright rosy pink and crimson, shaded with bronzy green, branching freely, and making a compact and handsome plant. Brazil, 1865.

ALTERNATE. Placed on opposite sides of an axis on a different line, as in alternate leaves.

ALTHÆA (from *altheo*, to cure; in reference to the medicinal qualities of some of the species). Marsh Mallow. ORD. *Malvaceæ*. Hardy biennials or perennials, closely allied to *Malva*. Outer calyx six to nine-cleft, inner one five-cleft. Most species belonging to this genus are worthy of cultivation, particularly in woods, coppices, and shrubberies; they will thrive in almost any kind of soil. They may be either increased by dividing the plants at the roots, or by seeds; the biennial species must be raised from seed every year, which may be sown in spring where they are intended to remain, or in pans placed in a cold frame, from which the young plants may be removed when large enough.

A. cannabina (Hemp-leaved).* *fl.* rose-coloured; peduncles axillary, many-flowered, loose, longer than the leaves. June. *l.* pubescent, lower ones palmately-parted, upper ones three-parted; lobes narrow, and grossly toothed. *h.* 5ft. to 6ft. South France, 1597. Perennial.

A. caribæa (Caribean).* *fl.* rose coloured, with a yellow base, solitary, almost sessile. March. *l.* cordate, roundish, lobed, crenate-

serrated. Stem straight, hispid. *h.* 3ft. Caribbee Islands, 1816. Biennial.

A. ficifolia (fig-leaved). Antwerp Hollyhock. *fl.* generally yellow or orange coloured, in terminal spikes, large, single or double. June. *l.* divided beyond the middle into seven lobes; lobes oblong, obtuse, irregularly toothed. *h.* 6ft. Siberia, 1597. Biennial.

A. flexuosa (zigzag).* *fl.* scarlet, axillary, solitary, stalked; petals obcordate. June. *l.* cordate, somewhat seven-lobed, obtuse, on long footstalks. *h.* 2ft. to 3ft. North India, 1803. Perennial.

A. frutex (shrubby). Synonymous with *Hibiscus syriacus*.

A. narbonensis (Narbonne).* *fl.* pale red; peduncles many-flowered, loose, longer than the leaves. August. *l.* pubescent, lower ones five or seven-lobed, upper ones three-lobed. *h.* 3ft. to 6ft. France, 1780. Perennial.



Fig. 69. Flower and Buds of Althæa officinalis.

A. officinalis (officinal). Common Marsh Mallow. *fl.* of a delicate, uniform blush colour; peduncles axillary, many-flowered, much shorter than the leaves. July. *l.* clothed with soft, white tomentum on both surfaces, cordate or ovate, toothed, undivided, or somewhat five-lobed. *h.* 3ft. to 4ft. Marshes, Britain. Perennial. See Fig. 69.

A. rosea (rose).* Hollyhock. *fl.* rose-

coloured, large, axillary, sessile, somewhat spiked at the top. July. *l.* cordate, with five or seven angles, crenated, rough. Stem straight, hairy. *h.* 8ft. China, 1573. For special culture and varieties, *see* **Hollyhock**.

A. striata (streaked). *fl.* white, 2½in. in diameter, solitary, on short pedicels; calyx striped. July. *l.* cordate, bluntly three-lobed, crenated. Stem puberulous, and somewhat scabrous. *h.* 5ft. Biennial.

ALUMINOUS. Pertaining to, or containing alum, or alumina; as Aluminous soils.

ALUM-ROOT. *See* **Heuchera**.

ALYSSUM (from *a*, not, and *lyssa*, rage; in reference to a fable that the plant allayed anger). Madwort. Including *Psilonema*, *Ptilotrichum*, *Schivereckia*. ORD. *Cruciferæ*. Annuals or dwarf, branching, shrubby perennials, often clothed with hoary, stellate hairs. Flowers small, cruciform, white or yellow. Leaves distant, or the radical ones tufted, usually entire. Several of the species are very much alike. They are excellent plants for the rockery, or for the front of borders, growing freely in common but well-drained garden soil. They may be increased by cuttings, by division of the roots, or by seed. The cuttings should be made from young shoots, 2in. to 3in. in length, inserted in sandy loam, early in the season, in a shady place. Seed may be raised outside, or in a frame in pans in sandy soil, most of them germinating in two or three weeks.

A. alpestre (alpine).* *fl.* yellow; raceme simple. June. *l.* obovate, hoary. Stem rather shrubby at the base, diffuse, greyish. *h.* 3in. South Europe, 1777. Perennial. A very neat little tufted species. *A. argenteum* (silvery), *A. Bertolonii* (Bertoloni's), and *A. murale* (wall), are larger growing species allied to the above, but of less cultural merit.



FIG. 70. ALYSSUM SAXATILE.

A. a. obtusifolium (obtuse-leaved). *fl.* yellow, corymbose. June. *l.* obovate-spathulate, blunt, silvery on the under surface. *h.* 3in. Tauria,

1828. A rare alpine.



Fig. 71. Alyssum saxatile variegatum, showing Flower and Habit.

A. atlanticum (Atlantic). *fl.* yellow; raceme simple. June. *l.* lanceolate, hoary, and pilose. Stems shrubby at the base, erect. *h.* 6in. to 1ft. S. Europe, 1820. *A. Marschallianum* is intermediate between *A. alpestre* and *A. a. obtusifolium*; but is seldom met with under cultivation.

A. gemonense (German).* *fl.* yellow, in close corymbs. April to

June. *l.* lanceolate, entire, greyish-velvety from stellate down. Stem shrubby at the base. *h.* 1ft. Italy, 1710. Closely allied to *A. saxatile*, but not so hardy; it is very desirable for rockeries.

A. macrocarpum (large-fruited). *fl.* white, racemose. June. *l.* oblong, blunt, silvery. Stem shrubby, branched, somewhat spiny. *h.* 8in. South of France, 1828. *A. spinosa* (thorny), and *A. halimifolia* (purslane-leaved), are very like this species. *A. dasycarpum* (thick-fruited) is an annual with yellow flowers.

A. maritimum. *See* **Kœniga**.

A. montanum (mountain). *fl.* yellow, sweet-scented; raceme simple. May to July. *l.* somewhat hoary; lower ones obovate; upper ones oblong. Stems rather herbaceous, diffuse, pubescent. *h.* 2in. or 3in. Europe, 1713. A distinct and charming species for the rockery, forming compact tufts of slightly glaucous green. *A. cuneifolium* (wedge-leaved), *A. diffusum* (diffuse), and *A. Wulfenianum* (Wulfenius') come close to this species, the latter being the most desirable.

A. olympicum (Olympian). *fl.* deep yellow, small, in roundish corymbose heads. Summer. *l.*

spathulate, sessile, very small, greyish. *h.* 2in. to 3in. Northern Greece.

A. orientale (Oriental).* *fl.* yellow, corymbose. May. *l.* lanceolate, repandly-toothed, waved, downy. Stems suffruticose at the base. *h.* 1ft. Crete, 1820. There is a variety with variegated leaves.

A. saxatile (rock).* *fl.* yellow, in close corymbose heads. April. *l.* lanceolate, entire, clothed with hoary tomentum. Stems shrubby at the base. *h.* 1ft. Eastern Europe, 1710. A very common and showy spring plant. See Fig. 70.



Fig. 72. Flower Spike of Amaranthus caudatus.

A. s. variegatum (variegated).* A constant and prettily variegated form, which is even more handsome than the type. On the rockery it does well, as it requires a sunny, well drained, position. See Fig. 71.

A. serpyllifolium (Thyme-leaved).* *fl.* pale yellow, in simple racemes. April to June. *l.* very small, ¼in. to ½in. long, ovate, scabrous, hoary. *h.* 3in. to 4in. Branches spreading, sub-woody at the base. South Europe, 1822.

A. tortuosum (twisted). *fl.* yellow; raceme corymbose. June. *l.* hoary, somewhat lanceolate. Stem shrubby at the base, twisted, diffuse. *h.* 6in. Hungary, 1804.

A. Wiersbeckii (Wiersbeck's).* *fl.* deep yellow, in close corymbose heads, about 1½in. across. Summer. *l.* 2in. long, oval-oblong-pointed, sessile, attenuated at the base, roughish and hairy. Stems erect, scabrous, simple, rigid. *h.* 1½ft. Asia Minor.

AMARANTHACEÆ. An extensive order of herbs or (rarely) shrubs, with opposite or alternate leaves, and inconspicuous apetalous flowers, which are spicately or capitately disposed. The majority of this order are weeds; well-known exceptions being many species of *Amaranthus*.

AMARANTH, GLOBE. *See* **Gomphrena**.

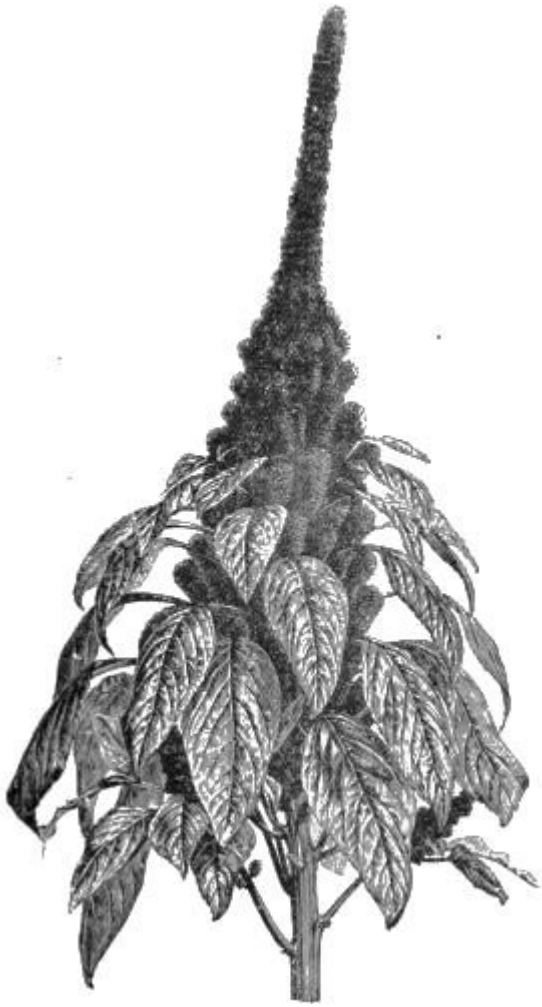


Fig. 73. Flower Spike of Amaranthus hypochondriacus.

AMARANTHUS (from *a*, not, and *maraino*, to wither; in reference to the length of time some of the flowers retain their colour). Ord. *Amaranthaceæ*. Hardy or half-hardy annuals, with alternate entire leaves and small green or red flowers in large bracteate clustered spikes. Flowers polygamous, furnished with

three bracts at the base of a three or five-lobed glabrous perianth. Stamens four or five. Of very easy culture; they thrive best in rich loamy soil, and are largely employed for sub-tropical and other bedding, for vases and conservatory decorations, being very ornamental. The seed should be sown in April in a hotbed, and the plants thinned out in the same situation when about ½in. high. About the end of May, they can be transplanted out of doors in their permanent situations. They are also very handsome when grown in pots. The young plants should be potted off early, and freely encouraged, allowing plenty of pot-room and moisture, and be kept near the glass, to bring out their brightest colouring. To develop their full beauty, plenty of room is required. There are about twelve species (indigenous to warm and tropical countries).

A. bicolor (two-coloured). *l.* green, variously streaked with light yellow. *h.* 2ft. India, 1802. This species is rather delicate, and must have a warm sunny situation.

A. b. ruber (red).* *l.* brilliant glistening scarlet, merging into a dark violet red, mixed with green. Hardier than the type.

A. caudatus (caudate).* Love Lies Bleeding. *fl.* dark purplish, collected in numerous whorls, which are disposed in handsome drooping spikes. August. *h.* 2ft. to 3ft. India, 1596. A very common and vigorous growing hardy annual. There is a yellowish-flowered variety, which, though less ornamental, is an

effective contrast. See Fig. 72.

A. cruentus (dark bloody). Synonymous with *A. hypochondriacus*.

A. Henderi (Hender's). *l.* lanceolate, undulated, intense rosy carmine, varying with orange buff, golden yellow, and olive green. *h.* 3ft. A garden hybrid, closely allied to *A. salicifolius*. Pyramidal habit.

A. hypochondriacus (hypochondriac).* Prince's Feather. *fl.* deep crimson, on densely packed, erect spikes. July. *l.* purplish beneath. *h.* 4ft. to 5ft. Asiatic, 1684. SYN. *A. cruentus*. See Fig. 73.

A. h. atropurpureus (dark purple).* An improved variety of above.

A. melancholicus ruber (melancholy-red).* *h.* about 1ft. Japan. A compact growing variety, with large shaded crimson leaves. Largely used for bedding purposes.

A. salicifolius (willow-leaved).* *l.* 7in. to 15in. long, willow-shaped, linear, and wavy, which, by their drooping outline, present a very elegant and effective appearance. When fully grown, the leaves are brilliantly banded and tipped with orange, carmine, and bronze. *h.* 3ft. Philippine Isles, 1871.

A. s. Princess of Wales.* *l.* carmine,

orange green, and bright yellow, beautifully blended. *h.* 3ft. A garden hybrid.

A. sanguineus (bloody). *fl.* purple, disposed partly in small heads in the axils of the upper leaves, and partly in slender, flexible spikes, which form a more or less branching panicle. July. *l.* blood red. *h.* 3ft. Bahama, 1775.



FIG. 74. AMARANTHUS TRICOLOR.

A. speciosus (showy).* *fl.* dark crimson purple, disposed in large erect spikes, forming a fine plumy panicle. July. *l.* suffused with a

reddish tinge, which disappears at the time of flowering. *h.* 3ft. to 5ft. Nepaul, 1819.

A. s. aureus (golden). *fl.* of a fine brownish-golden hue. Very effective when grown in masses.

A. tricolor (three-coloured).* *l.* of a fine, transparent, purplish-red or dark carmine from the base to the middle; a large spot of bright yellow occupies the greater part of the upper end of the leaf; point generally green; leafstalks yellow. *h.* 1½ft. East Indies, 1548. See Fig. 74. There are several garden varieties of this species, requiring a somewhat warmer situation.

AMARYLLIDEÆ. A large and important order of usually bulbous plants, sometimes with a stem. Flowers solitary, umbellate, or paniculate; perianth superior, six-lobed, often with a corona at the top of the tube. Leaves ensiform or linear. This order contains many very beautiful genera, including *Agave*, *Amaryllis*, *Crinum*, *Hæmanthus*, *Hippeastrum*, *Narcissus*, *Pancratium*, and several others.

AMARYLLIS (from *Amaryllis*, the name of a country-woman mentioned by Theocritus and Virgil). ORD. *Amaryllideæ*. Half-hardy or hardy, deciduous, bulbous plants. Flowers large, sweet-scented, pedicelled; spathe two-leaved; umbels few-flowered; perianth with a very short tube, funnel-shaped, six-parted, sub-regular or irregular; segments many-nerved, broad, undulate, spreading somewhat at the apices; stamens at the summit of the tube, unequal,

declined; anthers fixed by the middle, incumbent, curved into a circular arch after bursting; style declined; stigma thickened, sub-three-lobed; scape tall, solid, compressed. Capsule obovate; seeds globose, fleshy. Leaves appearing at a different season from the scapes, numerous, strap-shaped. The following genera are sometimes arranged hereunder, but in this work are treated separately: *Brunsvigia*, *Crinum*, *Hippeastrum*, *Nerine*, *Sprekelia*, *Sternbergia*, *Vallota*, *Zephyranthes*. Warm, dry, and well-drained positions in front of hothouses, or at the base of south or south-west walls, are the most suitable sites for *A. Belladonna* and its varieties. The soil should be composed of good, fibrous loam, leaf mould, and sand, in equal parts. Insert the bulbs 6in. to 8in. deep, and surround with sand, after which they may be covered with the compost, which should be pressed firmly about them; they should not be again disturbed for years, when they will ultimately establish themselves, and produce grand masses of blossom. The best time to plant a fresh stock is June or July, when they commence root-action, before the flower-stems are sent up. In their growing season, and in dry weather, an occasional soaking of clear water, or liquid manure, will be greatly beneficial. The extremely ornamental plants now largely grown, and frequently classed as *Amaryllis* in nurserymen's catalogues, belong to the genus *Hippeastrum*. For pot-culture of the Belladonna Lily, *see* **Hippeastrum**.



Fig. 75. Amaryllis Belladonna, showing Habit at Flowering Season.

A. Belladonna.* Belladonna Lily. This splendid species is very variable, both in the size and colour of the flowers, frequently producing variously-shaded flowers, from almost white to a reddish or purplish hue. Autumn. West Indies, 1712. See Fig. 75. The leaves and flowers are not produced together. In Fig. 76 they are both shown in the same illustration for economy of space.

A. B. pallida (pale).* A pale-

coloured variety. *h.* 2ft.

AMASONIA (named in honour of Thomas Amason, one of the earlier American travellers). SYN. *Taligalea*. ORD. *Verbenaceæ*. A genus comprising six species (which may be reduced to four) of stove sub-shrubs, natives of tropical America. Flowers yellow or sulphur-coloured, racemose or panicled; calyx five-cleft; corolla five-cleft, sub-bilabiate. Leaves alternate, toothed or rarely entire. For culture of the only species introduced, *see* **Clerodendron**.

A. punicea (reddish-brown). *fl.* yellow, with pretty, brownish bracts; peduncles once or twice trifid, cymose or one-flowered. May and June. *l.* slender, 3in. to 2in. long, oblong- or elliptic-lanceolate, shortly acuminate, unequally toothed. Stem erect, simple or slightly branched. *h.* 2ft. to 3ft. Brazil, 1884.

AMATEUR. This term is usually meant to refer to one who has a taste for a particular pursuit, and who is, in a pecuniary point of view, independent of it. An Amateur gardener is one who rears and grows his plants, and cultivates his garden, for his own amusement—for mere love of horticulture.



Fig. 76. Amaryllis Belladonna, showing Bulb and Flower Spike.

AMBER, SWEET. *See* **Hypericum Androsæmum**.

AMBER-TREE. *See* **Anthospermum.**

AMBROSINIA (commemorative of Professor Giacinti Ambrosini, of Bologna). Ord. *Aroideæ* (*Araceæ*). A curious, half-hardy, tuberous perennial, thriving in

any light soil, with protection in winter. Increased by seeds, and by divisions. The former should be sown, as soon as ripe, in a cool house; and the latter should be made just previous to new growth in spring.

A. Bassii (Bass's).* *fl.*, spathes prolonged into a long tail, and a tongue-shaped spadix, with the male flowers on one side, and so placed as to preclude the access of pollen to the stigma on the other side of the spathe, save by insect agency. *l.* oblong, stalked. *h.* 4in. Corsica, Sardinia, 1879.

AMBURY, or **ANBURY**. The name given to galls of small Weevils (*Ceuthorhynchus sulcicollis*) which appear on the roots of Cabbages and Turnips, as well as of the Wild Mustard, and of other weeds belonging to the genus *Brassica*. The galls form swellings individually about the size of split peas, but often two or more are joined to form considerable masses. In each is a space inclosing a white grub. Anbury is usually not very hurtful. It is quite distinct from Clubbing. The galled roots should be collected, before the grubs emerge, and burned.

AMELANCHIER (Savoy name of the Medlar, to which this genus is closely allied). TRIBE *Pomaceæ* of ORD. *Rosaceæ*. Hardy, deciduous shrubs or small trees, with racemes of white flowers, and simple, serrated leaves; bracteas linear-lanceolate. Pome, when mature, three to five-celled. They are of easy cultivation, in a somewhat rich, loamy soil, and are propagated by layers or cuttings, in autumn, in sheltered situations; by seeds, and by grafting, in early spring, on the Hawthorn or the Quince, or the

weaker on the stronger-growing species.

A. canadensis (Canadian).* Grape Pear. *fl.* white. April. Pome purple. *l.* oblong-elliptic, cuspidate, when young rather villous, but at length glabrous. *h.* 6ft. to 8ft. Canada, 1746. A very ornamental tree, having a profusion of flowers in early spring, and rich autumnal foliage. SYN. *Pyrus Botryapium*.

A. c. florida (flowery).* *fl.* white, numerous, in upright racemes. May. Pome purple. *l.* oblong, obtuse at both ends, coarsely serrate in the terminal portion, glabrous in every state. *h.* 10ft. to 20ft. North America, 1826.

A. c. ovalis (oval-leaved). *fl.* white; racemes pressed together. April. *l.* roundish-elliptic, acute when rather young, velvety beneath, glabrous when mature. *h.* 6ft. to 8ft. North America, 1800.

A. c. parvifolia (small-leaved). This has a dwarfer habit, and shorter leaves, than the type.

A. sanguinea, (bloody). *fl.* white; racemes capitate. April. Pome blackish-purple. *l.* oblong, rounded at both ends, sharply serrated, always naked. *h.* 4ft. to 8ft. North America, 1800. This form differs principally from *A. canadensis* in the fewer flowers, much shorter raceme,

and shorter, broader, and more ovate petals.

A. vulgaris (common).* *fl.* white. April. Pome darkish-purple. *l.* roundish-oval, bluntish, pubescent beneath, at length glabrous. *h.* 3ft. to 9ft. Europe, 1596. A desirable shrub, producing an abundance of flowers. SYN. *Mespilus Amelanchier*.

AMELLUS (a name employed by Virgil for a blue, Aster-looking plant growing on the banks of the river Mella). ORD. *Compositæ*. Pretty, branched, ascending or diffuse, perennial herbs. Flowers in solitary heads. Leaves hairy, lower ones opposite, upper alternate. Of very easy culture, in ordinary garden soil. Increased by divisions, or cuttings, inserted under glass, in spring.

A. Lychnitis (Lychnitis). *fl.-heads* violet, solitary, terminal, and lateral. June. *l.* linear, lanceolate, entire, hoary. *h.* 6in. Cape of Good Hope. Evergreen, greenhouse trailer.

AMENTUM. A catkin. A deciduous spike of unisexual, apetalous flowers.

AMERICAN ALMOND. *See* **Brabejum.**

AMERICAN ALOE. *See* **Agave americana.**

AMERICAN BLIGHT, or **WOOLLY APHIS** (*Schizoneura lanuginosa*). The white, cottony-looking matter which is found upon the bark of the Apple and other trees of a similar nature, belongs to a species of Aphis, which has short legs: the females are wingless, while the males are winged; the latter

appear in July and August. The insects belong to a group of Aphides unprovided with honey tubes on the hinder part of the body, and in which the third vein of the front wing shows only one fork The woolly coating also distinguishes them from true Aphides. The Blight is said to have been imported from America in 1787, but this is uncertain.

As these insects get into the cracks and under the bark of trees, they are hard to dislodge. The injury inflicted is not apparent for some time; but, in process of time, large, cankerous wounds are produced, which gradually (with the aid of the insects) destroy the branches, and render the tree useless. If young trees are attacked, they are rendered valueless in a very short time. The insects hide in crevices of the bark of the trees each autumn, and remain dormant during the winter, ascending to their old quarters as the weather becomes warm. Trees which are covered with moss and lichens probably serve as places for hybernation; hence, it is desirable to remove such hiding-places, as well as all pieces of dead bark. To their being left may be frequently attributed the severe attacks of Blight experienced where they exist on trees. So soon as the cottony substance makes its appearance, one of the following remedies should be applied, and, if persisted in for a few seasons, the trees will be quite cleared.

Brushing and Scraping. In winter, the trees should be thoroughly cleaned; and, so long as there is a chance of the insects being in the bark, all loose pieces, moss, &c., should be brushed off, and the parts affected should be thoroughly saturated with a strong solution of soft soap or of soft soap and lime-water, applied with a stiff brush, so as to enter all

the crevices.

Gas Liquor. This is the ammoniacal liquor from gas works. It must be diluted with from eight to twelve times its bulk of water, or it is dangerous to the trees; in fact, after dilution, it is advisable to test it, previous to using to any great extent. As the woolly covering of the insects resists water, it is desirable that the liquor be applied with a brush, and forced amongst the Blight.

Infusion of Tobacco Leaves (½lb. to 1 gallon) kills the insects on shoots dipped into it.

Paraffin or Petroleum. This is a simple and useful remedy. Obtain a painter's half-worn sash-tool, free from paint, and just moisten it in the oil. Then brush out each infested place as often as the Blight appears, and in one season the trees will be cleared.

Spent Tan. Collect spent tan into a heap a month or two before it is to be used, and if it has heated well and rotted, so much the better. In winter, clear away all leaves, rubbish, grass, &c., and spread the tan at the rate of about thirty loads to the acre, taking care that it surrounds the base of each tree infested with Blight. Practical proof of its utility has been given.

Turpentine and other Spirits. The mode of applying these is the same as for paraffin, but they frequently injure the bark, and sometimes kill young trees.

To kill insects on the roots, it is well to clear away the soil as far as possible from them, and to saturate the place with soapsuds or ammoniacal solutions; soot, quicklime, or other applications to the soil would also prove useful.

Other remedies that have been suggested are the drainings of stables, and grafting-clay plastered over

the bark.

AMERICAN CENTAURY. *See* **Sabbatia**.

AMERICAN CHINA ROOT. *See* **Smilax**.

AMERICAN COWSLIP. *See* **Dodecatheon**.

AMERICAN CRANBERRY. *See* **Oxycoccus macrocarpus**.

AMERICAN CRESS. *See* **Barbarea.**

AMERICAN DEWBERRY. *see* **Rubus canadensis**.

AMERICAN GOOSEBERRY. *See* **Pereskia aculeata**.

AMERICAN GREAT LAUREL. *See* **Rhododendron maximum**.

AMERICAN HIGH BLACKBERRY. A common name for **Rubus villosus** (which *see*).

AMERICAN MANDRAKE. *See* **Podophyllum peltatum**.

AMERICAN MOUNTAIN ASH. *See* **Pyrus americana**.

AMERICAN PLANTS. This term includes *Rhododendron*, *Azalea*, and several others of similar habit and constitution; indeed, any hardy, flowering shrubs requiring a moist peat border.

AMERICAN SPANISH OAK. *See* **Quercus falcata**.

AMERICAN SWAMP LILY. *See* **Saururus cernuus**.

AMERICAN WHITE OAK. *See* **Quercus alba**.

AMERICAN WILD BLACK CURRANT. *See* **Ribes floridum**.

AMERICAN WILD RED RASPBERRY. *See* **Rubus strigosus**.

AMERIMNON (from *a*, privative, and *merinna*, care; in allusion to the little attention the plant requires; name originally applied to the House-leek). SYN. *Amerimnum*. ORD. *Leguminosæ*. Ornamental, evergreen, stove shrubs, with alternate, stalked, ovate, somewhat cordate, simple leaves. For culture, *see* **Anona.**

A. Brownei (Browne's).* *fl.* white, sweet-scented; peduncles axillary, ten-flowered, glabrous or puberulous. May. *l.* ovate, somewhat cordate, acute, glabrous. *h.* 6ft. to 10ft. Jamaica, 1793. Requires a trellis or other support.

A. strigulosum (strigulose). *fl.* white; racemes axillary, solitary, three times longer than the petioles. May. *l.* ovate, rather cordate, obtuse, clothed with adpressed hairs on both surfaces; branches and petioles clothed with light brown, dense, short hairs. *h.* 6ft. to 10ft. Trinidad, 1817.

AMERIMNUM. A synonym of **Amerimnon** (which *see*).

AMHERSTIA (commemorative of Countess Amherst, a zealous promoter of natural history, particularly botany). ORD. *Leguminosæ*. A stove, evergreen tree of almost unsurpassed magnificence and brilliancy, requiring a very high and moist temperature. It delights in a rich, strong loam, and may be propagated by cuttings of the half-ripened wood, inserted in sand, under a glass in bottom heat of about 80deg.; also by seeds.

A. nobilis (noble).* *fl.* of a fine vermilion colour, diversified with yellow spots, large; racemes long, pendulous, axillary. May. *l.* large, impari-pinnate, bearing six to eight pairs of leaflets. *h.* 30ft. to 40ft. India, 1837. The flowers are, unfortunately, somewhat ephemeral, lasting but a few days in perfection, during which period, however, no object in the whole range of the vegetable kingdom presents a more striking aspect than this tree.

AMICIA (commemorative of J. B. Amici, a celebrated French physician). ORD. *Leguminosæ*. A pretty, greenhouse or half-hardy perennial, succeeding in any warm, sheltered spot. Young cuttings will root in sand, under a hand glass, in heat.

A. Zygomeris (two-jointed-podded).* *fl.* yellow, splashed with purple on the keel; peduncles axillary, five or six-flowered. Autumn. Legumes with two joints. *l.* abruptly pinnate, with two pairs of cuneate-obcordate, mucronate leaflets, which are full of pellucid dots; branches and petioles pubescent. *h.* 8ft. Mexico, 1826.

AMMOBIUM (from *ammos*, sand, and *bio*, to live; in reference to the sandy soil in which it is found). ORD. *Compositæ*. This well-known everlasting is closely allied to *Gnaphalium*, from which it differs principally in habit. Receptacle with oblong, pointed, toothed, chaffy scales; involucre of imbricated

leaflets. It may be treated as a half-hardy annual, or as a biennial, if seeds are sown in September and kept in a cool greenhouse during the winter, and this is the best way to grow it. Any moderately good soil suits it.

A. alatum (winged). *fl.-heads* about 1in. across, of a silvery whiteness, with the exception of the yellow disk florets, very numerous, in loose, corymbose panicles. May to September. *l.* oblong-lanceolate; radical ones in a tufted rosette. Stems winged—hence the specific name. *h.* 1½ft. to 2ft. New Holland, 1822. See Fig. 77.

A. a. grandiflorum (large-flowered).* *fl.-heads* purer white, nearly twice the size of those in the type. This variety, which comes true from seed, is a great acquisition.

AMMOCHARIS. *See* **Brunsvigia.**

AMMODENDRON (from *ammos*, sand, and *dendron*, a tree; in reference to its natural habitat). SYN. *Sophora*. ORD. *Leguminosæ*. A small, neat, hardy evergreen, silky shrub, having the petioles hardening into spines; an excellent subject for shrubberies. It thrives in an ordinary soil, with good drainage, and is propagated by layers and seeds.

A. Sieversii (Sievers').* *fl.* purple, disposed in racemes. June. *l.* bifoliolate; leaflets lanceolate, silky-white on both surfaces. *h.* 2ft. to 4ft. Siberia, 1837.

AMMYRSINE. *See* **Leiophyllum**.

AMOMOPHYLLUM. *See* **Spathiphyllum**.



FIG. 77. INFLORESCENCE OF AMMOBIUM ALATUM.

AMOMUM (from *a*, not, and *momos*, impurity; in reference to the quality of counteracting poison). ORD. *Zingiberaceæ*. Stove, deciduous, herbaceous perennials, chiefly aromatic, formerly used in embalming. Flowers produced close to the ground, in spikes or clusters, bracteate. Leaves distichous, sheathing at the base, lanceolate, entire. For culture, *see* **Alpinia.**

A. angustifolium (narrow-leaved).* *fl.* sometimes of a uniform chrome-

yellow, sometimes crimson, with the labellum of a yellow colour, more or less pale, and sometimes entirely crimson; scape naked, from 3in. to 8in. in length; spike capitate. July. *l.* linear-lanceolate. *h.* 8ft. Madagascar.

A. Cardamomum (Cardamom).* *fl.* brownish; lip three-lobed, spurred; scape compound, flexuous, procumbent. August. *h.* 8ft. East Indies, 1823.

A. Danielli (Daniel's). *fl.* 4in. across; outer sepals fine red; the spreading labellum whitish, tinged with rose and yellow; scape short, arising from the bottom of the stem. *l.* oblong-lanceolate, 9in. long. *h.* 2½ft. Western Africa.

A. grandiflorum (large-flowered). *fl.* white, numerous, close; spike short. June. *l.* elliptic-lanceolate, pointed. *h.* 3ft. Sierra Leone, 1795.

A. Granum Paradisi.* Grains of Paradise. *fl.* white, tinged with yellow and rose. *l.* elliptic-lanceolate, long-pointed. Stems very red at base, and dull purplish-red above from the long, sheathing leafstalks. *h.* 3ft. West Africa.

A. Melegueta (Melegueta).* Grains of Paradise. *fl.* pale pink, solitary, with an orbicular, irregularly toothed lip. May. *l.* narrow, linear-elliptic, distichous, sessile. *h.* 1ft. to

2ft. Sierra Leone, 1869. Habit creeping.

A. sceptrum (sceptre). *fl.* bright rose purple, large, sub-erect; the most conspicuous portion is the lip, which is 2½in. in diameter; flower-scapes 6in. high. January. *l.* narrow, oblong-lanceolate. *h.* 5ft. to 6ft. Old Calabar, 1863.

A. vitellinum (yolk-of-egg-coloured). *fl.* yellow; lip oblong, obtuse, toothed; spike oblong, sessile, rather loose. April. *l.* oval. *h.* 2ft. East Indies, 1846. Plant stemless, glabrous.

AMORPHA (from *a*, not, and *morphe*, form; incomplete formation of the flowers). Bastard Indigo. ORD. *Leguminosæ*. A handsome genus of hardy deciduous shrubs with very graceful impari-pinnate leaves, and many pairs of leaflets, which are full of pellucid dots. Racemes spicate, elongated, usually in fascicles at the tops of the branches; corolla without wings and keel; vexillum or standard ovate, concave. They are well adapted for small shrubberies, requiring a sheltered situation, and thrive well in common garden soil. Increased by layers, or cuttings, taken off at a joint, and planted in a sheltered situation early in autumn; these should be allowed to remain undisturbed till the following autumn. Amorphas produce an abundance of suckers, from which they may be readily propagated.

A. canescens (hoary).* The Lead Plant. *fl.* dark blue. July. *l.*, leaflets ovate-elliptic, mucronate. *h.* 3ft.

Missouri, 1812. Whole plant clothed with hoary hairs.

A. fruticosa (shrubby).* The False Indigo. *fl.* very dark bluish purple. June. *l.*, leaflets elliptic-oblong; lower ones distant from the stem. *h.* 6ft. Carolina, 1724. Shrub glabrous, or a little villous. There are several varieties, having mucronate, emarginate, or narrower leaflets, but all with purple flowers. A host of names, representing the merest forms of *A. fruticosa*, are to be found in nurserymen's catalogues. Amongst them are: *caroliniana*, *crocea*, *crocea-lanata*, *dealbata*, *fragrans*, *glabra*, *herbacea*, *nana*, *pubescens*, &c. These differ so slightly from the type and from each other, that it is impossible to distinguish them.

AMORPHOPHALLUS (from *amorphos*, deformed, and *phallos*, a mace; alluding to the inflorescence). SYN. *Pythion*. Including *Proteinophallus*. ORD. *Aroideæ (Araceæ)*. A very remarkable genus, closely allied to *Arum*, but distinguished therefrom by "their spreading, not convolute, spathes; by their anthers opening by pores, not by longitudinal slits; by the numerous cells to the ovary; and by the solitary, erect ovules, those of *Arum* being horizontal." A soil consisting of two-thirds good rich loam, with the additional third of sweet manure, thoroughly rotted, suits them well. Other essentials are plenty of pot room, a genial atmosphere, and a temperature ranging from 55deg. to 65deg., or even 70deg. They require to be kept dry, and warm in winter, as

nothing is more fatal to them than cold or damp. Beneath a shelf or stage in the stove is an excellent spot for them, or they may be stored in sand, and kept free from frost. They are difficult to increase; the corms of most of them are of great size, and rarely make offsets. Efforts should consequently be made to induce the plants to seed whenever practicable. All the species are strikingly effective in sub-tropical bedding. For fertilising and growth of seedlings, *see* **Arum.**

A. campanulatus (bell-shaped).* Similar to *A. Rivieri*, but the flowers are brown, red, and black, and the scape is neither so stout nor so tall. *h.* 2ft. India, 1817. SYN. *Arum campanulatum*.

A. grandis (large). *fl.*, spathe green, white inside; spadix purplish. *h.* 3ft. Java, 1865. Stove species.

A. Lacourii (Lacour's).* *l.* pedatisect, the ultimate segments lanceolate, yellow-spotted; petioles transversely mottled with yellow markings. Cochin China, 1879. Greenhouse. The correct name of this species is *Pseudodracontium Lacourii*.

A. nivosus. *See* **Dracontium asperum**.

A. Rivieri (Rivier's).* *fl.*, spadix, spathe, and scape, reaching 3ft. or more in height, appearing before the leaves; scape stout and strong, of a deep green colour, speckled or dotted with rose; spadix projecting,

deep red; spathe of a rosy-green colour. March to May. *l.* solitary, decompound, 40in. to 50in. across, on tall marbled petioles. Cochin China. Perhaps the most useful species. SYN. *Proteinophallus Rivieri*. See Fig. 78.

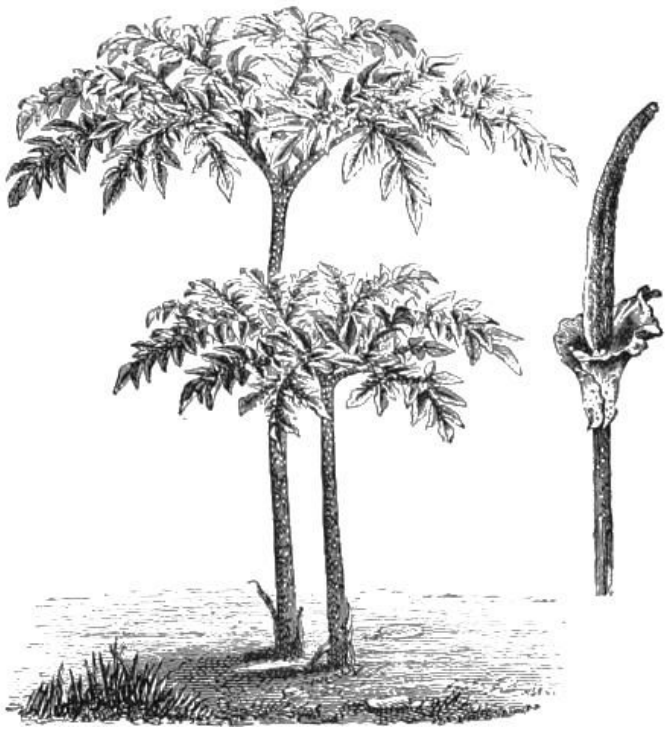


FIG. 78. AMORPHOPHALLUS RIVIERI, Foliage and Inflorescence.

A. Titanum (Titan's).* *fl.*, spadix 5ft. high, black purple; spathe nearly 3ft. in diameter, campanulate in shape, with patent and deeply toothed edges. The deeper portion of the interior is pale greenish, but the

limb is of a bright black purple hue; the outside is pale green, smooth in the lower portion, but thickly corrugated and crisp above; scape about 1½ft. long, green, marked with small whitish orbicular spots. *l.* the divided blade covers an area of 45ft. in circumference. West Sumatra, 1878. As will be seen from the above, this extraordinary plant is of gigantic proportions, and, in size of the flowers, eclipsing nearly all others in the vegetable kingdom. SYN. *Conophallus Titanum*.

AMORPHOUS. Without definite form.

AMPELOPSIS (from *ampelos*, a vine, and *opsis*, resemblance; resembling the Grape Vine in habit, and to which it is closely allied). SYN. *Quinaria*. ORD. *Ampelideæ*. A genus nearly allied to *Vitis*. Calyx slightly five toothed; petals concave, thick, expanding before they fall; disk none. Fast growing and ornamental climbing, hardy deciduous shrubs, of very easy culture in common garden soil. Cuttings, having a good eye, may be taken in September, and pricked either under handlights in sandy soil on the open border, or in pots stood on the stage or shelf in a greenhouse; they root readily, and will be fit for transplanting early in the spring. Or cuttings made from the young soft wood, expressly grown for the purpose, in spring, root freely in gentle heat. This applies especially to *A. tricuspidata*. They are also easily increased by layers. Most of the species will thrive with equal vigour in almost any position, however exposed.

A. aconitifolia (Aconite-leaved).* *l.* palmisect, with pinnatifid segments. China, 1868. A slender and very elegant free-growing species, with long reddish branches. There are two or more varieties. SYNS. *A. lucida*, *A. triloba*, *A. tripartita*, and *Vitis dissecta*. See Fig. 79.

A. bipinnata (bipinnate). *fl.* green, small; raceme stalked, twice bifid. Berries globose. June. *l.* bipinnate, smooth; leaflets deeply lobed. *h.* 10ft. Virginia, 1700.

A. hederacea (Ivy-leaved). Synonymous with *A. quinquefolia*.

A. japonica (Japanese). Synonymous with *A. tricuspidata*.

A. lucida (shining). Synonymous with *A. aconitifolia*.

A. napiformis (turnip-like).* Greenish. China, 1870. See Fig. 80.

A. quinquefolia (five-leaved).* Virginian Creeper. *fl.* greenish-purple; raceme corymbose. June. *l.* palmate, with three and five leaflets, smooth on both surfaces; leaflets stalked, oblong-acuminated, mucronately toothed; autumnal tint red. North America, 1629. SYN. *A. hederacea*.

A. q. hirsuta (hairy). *l.* downy on both surfaces.

A. serjaniæfolia (Serjania-leaved).* *l.* green, palmately five-parted, or the upper ones three-parted, the intermediate division being often ternate or pinnate; leaflets obovate acute, and incisely toothed or sublobate; the rachis is articulately winged. Japan, 1867. SYNS. *A. tuberosa*, *Cissus viticifolia*. Roots tuberous; see Fig. 81.



FIG. 79. STEM AND LEAVES OF AMPELOPSIS ACONITIFOLIA.

A. tricuspidata (three-pointed).* *l.* very variable in shape; younger ones almost entire; older ones larger, roundish-cordate, divided to the middle into three deltoid lobes, which run into little tails, and are coarsely toothed at the margin. Japan, 1868. SYNS. *A. Veitchii*, *Vitis japonica* (of gardens).

A. triloba (three-lobed). A synonym of *A. aconitifolia*.

A. tripartita (three-parted). A synonym of *A. aconitifolia*.

A. tuberosa (tuberous). A synonym of *A. serjaniæfolia*.

A. Veitchii (Veitch's). A synonym of *A. tricuspidata*.

AMPHIBLEMMA CYMOSUM. *See* **Melastoma corymbosum**.

AMPHIBLESTRA. Included under **Pteris** (which *see*).

AMPHICARPÆA (from *amphi*, both, and *karpos*, a fruit; in allusion to the two kinds of pods—those of the upper flowers being scimitar-shaped, three or four-seeded; those of the lower, pear-shaped, fleshy, usually ripening but one seed; these lower pods bury themselves in the ground after fertilisation). ORD. *Leguminosæ*. A genus of ornamental annuals, with herbaceous, twining stems, and sometimes apetalous flowers, allied to *Wistaria*. The species are of easy culture. Seeds should be sown in the open border, in spring, in a sunny situation.

A. monoica (monœcious). Hog Peanut. *fl.* with a pale violet vexillum, and white keel and wings; racemes axillary, pendulous. June to August. *l.* pinnately-trifoliate; leaflets ovate, glabrous. North America. 1781.



Fig. 80. Tubers and Leaf of Ampelopsis napiformis.

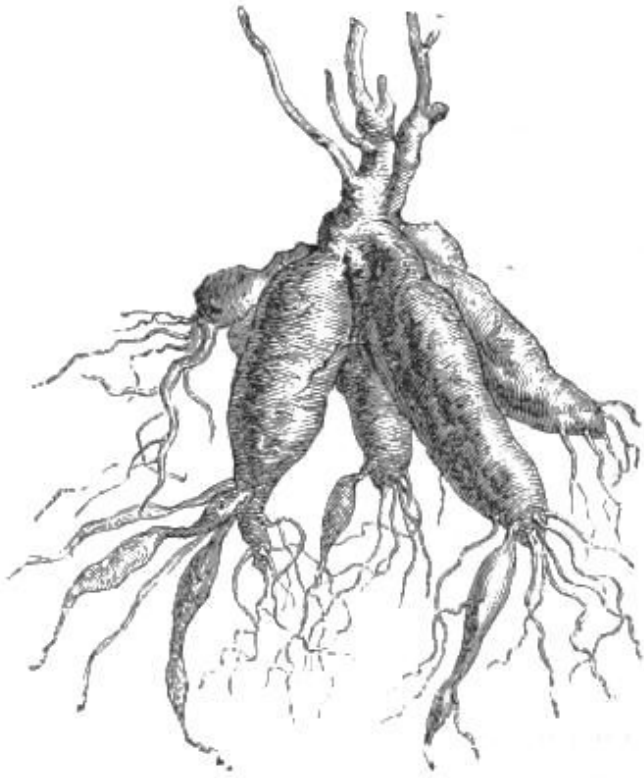


Fig. 81. Roots of Ampelopsis serjaniæfolia.

AMPHICOME (from *amphi*, on both sides, and *kome*, a head of hair; in reference to the seeds being furnished with a tuft of hairs at both ends). Ord. *Bignoniaceæ*. Flowers axillary or terminal. Leaves alternate, unequally pinnate. Very ornamental greenhouse or half-hardy rock herbaceous plants. If planted outside, they must be protected during the winter from wet and severe frosts. A mixture of loam, sand, and leaf soil suits them well. Increased by striking the young shoots in spring in sandy soil in gentle heat; or by seed, which should be sown in early spring, in pots of sandy soil placed in a greenhouse.

A. arguta (finely-cut).* *fl.* red, drooping; racemes axillary, terminal; corolla tubular near the base, ventricose above. August. *l.* alternate, impari-pinnate; leaflets opposite, on short petioles, three to four pairs, lanceolate, acuminated, deeply serrated. *h.* 3ft. Himalaya, 1837.

A. Emodi (Emodian).* *fl.* rose and orange, erect; racemes axillary; corolla 1½in. to 2in. long, bell-shaped, slightly tubular below. August to October. *l.* impari-pinnate, with numerous leaflets. *h.* 1ft. to 1½ft. India, at high altitudes, 1852. A very beautiful plant.

AMPHILOPHIUM (from *amphilophos*, crested on all sides; limb of corolla much curled). SYN. *Amphilobium*. ORD. *Bignoniaceæ*. A handsome stove evergreen climber. Corolla somewhat coriaceous, with a short tube, and a large ventricose throat. Loam and peat, well mixed, suits it best; cuttings from young shoots root readily in sand, under a hand glass, with bottom heat, during the spring months.

A. paniculatum (panicled).* *fl.* rose-coloured; panicle terminal, composed of three-flowered peduncles. June. *l.* joined by pairs, opposite; leaflets ovate-roundish, acuminated, sub-cordate. West Indies, 1738.

AMPLEXICAULIS. Embracing the stem; usually

applied to leaves.

AMPULLACEOUS. Resembling a bladder or flask.

AMSONIA (in honour of Charles Amson, a scientific traveller in America). ORD. *Apocynaceæ*. Very pretty hardy, herbaceous perennials, with alternate leaves, and terminal panicles of pale blue flowers; corolla with linear lobes, and a narrow funnel-shaped tube. They thrive in half shady positions in borders, or the edges of shrubberies, where they will not need to be frequently transplanted. Propagated by cuttings during the summer months, or by divisions of the roots in spring.

A. latifolia (broad-leaved). Synonymous with *A. Tabernæmontana*.



FIG. 82. AMSONIA SALICIFOLIA, showing Habit and Flower.

A. salicifolia (willow-leaved).* *fl.* light blue, in terminal corymbose

cymes; corolla small, funnel-shaped, with a rounded tube; throat whitish, bearded. Summer. *l.* lanceolate, smooth, acute. *h.* 1½ft. to 2½ft. North America, 1812. Habit less erect than the following species. See Fig. 82.

A. Tabernæmontana (Tabernæmontanus).* *fl.* pale blue, in cymes; petals lanceolate, acute, slightly hairy on the outside; sepals also lanceolate, acute. Summer. *l.* ovate-lanceolate, acute, shortly stalked. *h.* 1½ft. to 2½ft. North America, 1759. SYNS. *A. latifolia*, *Tabernæmontana Amsonia*.

AMYGDALUS (from *amysso*, to lacerate; fissured channels in the stone of the fruit). Almond. ORD. *Rosaceæ*. TRIBE *Drupaceæ*. Well known, ornamental, deciduous spring flowering shrubs. Drupe clothed with velvety pubescence, with a fibrous dry rind, separating irregularly, having the stone of the fruit pitted or smooth. The larger-growing species are very excellent for shrubberies, or as specimen trees; being in blossom before most other trees, they make a fine appearance in early spring. The dwarfer kinds are also well fitted for small shrubberies or the fronts of large ones. For greenhouse culture they should be obtained in a small pyramidal shape; they are not, however, suited to a small house, as the plants, to bloom well and be effective, ought to be at least 2ft. or 3ft. high, and proportionately wide. Plenty of root room is essential. After potting, water thoroughly, and place the trees in an orchard house for a few weeks, when they may be removed to their

permanent station. A temperature of about 50deg. or 55deg. is sufficient to hasten the flowering; a higher temperature is apt to frustrate the object in view. After flowering, gradually harden off the plants until about the end of May, when they may be plunged out of doors for the season. Repotting should be done as soon as the leaves fall. Increased by budding upon seedling plum-stocks in summer. The Almond is grown on the Continent for its fruit. *See also* **Prunus**.

A. argentea (silvery). A synonym of *A. orientalis*.

A. Besseriana (Besser's). A synonym of *A. nana*.

A. cochinchinensis (Cochin China). *fl.* white; racemes small, sub-terminal. *fr.* ovate, ventricose, acute at the apex. March. *l.* oval, quite entire. *h.* 30ft. to 40ft. Cochin China, 1825. Greenhouse.



Fig. 83. Flowering Branch of Amygdalus communis.

A. communis (common).* Common Almond. *fl.* white or rose coloured, solitary. March. *fr.* compressed, egg-shaped, tomentose. *l.* oblong lanceolate, serrulated. *h.* 10ft. to 30ft. Barbary, 1548. See Fig. 83.

A. c. amara (bitter).* Bitter Almond. *fl.* larger, white, but rose coloured at the base. April. Seeds bitter.

A. c. dulcis (sweet). Sweet Almond. *fl.* red, earlier; fruit ovate,

compressed, acuminated. Seeds sweet. *l.* of a greyish green colour.

A. c. flore-pleno (double-blossomed).* *fl.* flesh colour, full double, rosy in the bud. *l.* oval-elliptic, acuminate.

A. c. fragilis (brittle). *fl.* pale rose coloured, rising with the leaves; petals broader, deeply emarginate. *l.* shorter than those of the type.

A. c. macrocarpa (large-fruited).* *fl.* whitish rose colour, large, rising before the leaves, with broadly obcordate undulated petals. *fr.* larger than that of the type, umbilicate at the base, but acuminated at the apex. *l.* broader than the type, acuminated. There are also numerous other varieties.

A. incana (hoary).* *fl.* red, solitary. April. Drupe compressed, pubescent. *l.* obovate, serrated, clothed with white tomentum beneath. *h.* 2ft. A handsome dwarf shrub. Caucasus, 1815.

A. nana (dwarf).* *fl.* rose coloured, solitary. March. *fr.* of the same form as that of *A. communis*, but much smaller. *l.* oblong-linear, attenuated at the base, serrated, quite glabrous. *h.* 2ft. to 3ft. Tartary, 1683. SYN. *A. Besseriana*.

A. orientalis (Oriental). *fl.* rose coloured. March. *fr.* mucronate. *l.*

lanceolate, quite entire, almost permanent, clothed with silvery tomentum, as well as the branches. *h.* 2ft. to 4ft. Levant, 1756. SYN. *A. argentea*.

AMYLACEOUS. Starch-like.

AMYRIDACEÆ. *See* **Burseraceæ.**

AMYRIS (from *a*, intensive, and *myron*, balm; the whole of the trees in this genus smell strongly of balm or myrrh). ORD. *Burseraceæ.* Ornamental stove evergreen trees, abounding in a resinous fluid. Flowers white, disposed in panicles. Leaves unequally pinnate. They thrive well in a mixture of loam and peat; and cuttings root freely in sand, under a hand glass with bottom heat, during the spring months.

A. balsamifera (balsam-bearing). Synonymous with *A. toxifera.*

A. braziliensis (Brazilian).* *fl.* white; panicles axillary, shorter than the leaves. August. *l.* with one to three pairs of opposite leaflets; leaflets lanceolate, tapering to the base, rounded at the apex, mucronate, quite entire, veiny, shining above, discoloured beneath. *h.* 20ft. Brazil, 1823.

A. heptaphylla (seven-leaved). *fl.* whitish yellow; panicles branched, axillary, and terminal. *l.* with three to four pairs of alternate, simple leaflets, which are stalked, obliquely-lanceolate, acuminated,

entire. *h.* 16ft. India, 1823.

A. Plumieri (Plumier's).* Gum Elemi Tree. *fl.* white; panicles branched, terminal. The fruit of this species is the shape and size of an olive, but red, having an odoriferous pulp within it. *l.* leaflets three to five, all stalked, somewhat serrated, ovate, acuminate, villous beneath. *h.* 20ft. West Indies, 1820.

A. toxifera (poison-bearing).* *fl.* white; racemes simple, about the length of the petioles. *fr.* the shape of a pear, and of a purple colour, hanging in bunches. *l.*, leaflets five to seven, stalked, ovate, somewhat cordate, acuminated. *h.* 50ft. West Indies, 1818. The wood, known as Rhodes Wood, bears a fine polish, and has a pleasant smell. SYN. *A. balsamifera.*

ANACAMPSEROS (from *anakampto*, to cause return, and *eros*, love). SYN. *Rulingia*. ORD. *Portulacaceæ*. Very dwarf greenhouse succulent herbs or sub-shrubs, natives of the Cape of Good Hope. Flowers large, expanding only in the heat of the sun; petals five, very fugacious; sepals five, opposite, oblong, rather concrete at the base; pedicels one-flowered, short or elongated, disposed in racemes. Leaves ovate, fleshy. They grow freely in sandy loam, mixed with some lime rubbish; but little water is needed. Cuttings root freely if laid to dry a few days before planting. Leaves taken off close to the plants, and also left to dry for a short time before being planted, will take root. Seed, when obtainable, should be sown in the

spring.

A. arachnoides (cobwebbed).* *fl.* white; petals lanceolate; racemes simple. July. *l.* ovate, acuminated, difformed, green, shining, cobwebbed. *h.* 6in. to 9in. 1790.

A. filamentosa (thready). *fl.* reddish, or deep rose coloured; petals oblong. August. *l.* ovate-globose, gibbous on both sides, and cobwebbed, rather rugged above. *h.* 6in. to 1ft. 1795.

A. intermedia (intermediate). Very like *A. filamentosa,* but has broader and more numerous leaves.

A. rubens (reddish).* *fl.* red; racemes simple. July. *l.* ovate, difformed, shining, dark green, somewhat reflexed at the apex. *h.* 6in. to 9in. 1796.

A. rufescens (rusty-coloured). *fl.* reddish, similarly disposed to *A. varians*. July. *l.* crowded, expanded and recurved, ovate, acute, thick, green, usually dark purple beneath. *h.* 6in. 1818.

A. Telephiastrum (Telephium-like). Synonymous with *A. varians.*

A. varians (varying).* *fl.* reddish; racemes few-flowered, sub-panicled. July. *l.* ovate, difformed, glabrous. *h.* 3in. 1813. SYN. *A. Telephiastrum.*

ANACAMPTIS. *See* **Orchis**.

ANACARDIACEÆ. A rather large order of trees or shrubs, with a resinous, milky juice. Flowers inconspicuous. Leaves generally dotless. Ovary containing a single ovule. This order contains, among other genera, *Anacardium*, *Mangifera*, and *Rhus*.

ANACARDIUM (origin doubtful; probably from *ana*, like, and *kardia*, the heart; in reference to the form of the nut). ORD. *Anacardiaceæ*. An ornamental stove evergreen tree with entire, feather-nerved leaves and terminal panicles of flowers; nut reniform, umbilicated, seated laterally on a fleshy, wide, pear-shaped peduncle. It requires a light loamy soil. Ripened cuttings, with their leaves left on, root freely in sand under a hand glass, in heat.

> **A. occidentale** (Western). Cashew Nut. *fl.* reddish, small, very sweet scented, succeeded by an edible pome-like fruit of a yellow or red colour. *l.* oval, cuneated, very blunt, somewhat emarginate, obovate-oblong, entire, smooth. *h.* 16ft. West Indies, 1699.

ANADENIA. *See* **Grevillea**.

ANAGALLIS (from *anagelas*, to laugh; removing despondency: meaning doubtful). Pimpernel. ORD. *Primulaceæ*. Annual or perennial trailers with angular stems, opposite or verticillate leaves, and solitary pedunculate flowers; corolla rotate or funnel-shaped, deeply five-cleft. All are very pretty and free flowering plants, of easy culture. The annuals are raised from seed sown in a sunny spot in spring; the perennials are increased by striking cuttings of the

young shoots, or division, at any time, either under a hand glass or in a close frame. Keep in the shade until well established, and gradually harden off. Plant outside in light rich soil for summer flowering, and each year secure a stock in frames during the winter. They require, if left out of doors, a protection during the winter, except *A. tenella*.

A. fruticosa (shrubby).* *fl.* axillary, large, vermilion, with a dark throat. May to August. *l.* verticillate, four in each whorl. *h.* 2ft. Morocco, 1803. A biennial.

A. grandiflora (large-flowered).* *fl.* very variable, but intense blue and deep vermilion red are predominant. May to autumn. *h.* 4in. Habit very compact and neat, and very floriferous. There are several varieties. Annual.

A. indica (Indian). *fl.* deep blue, small. July. *h.* 1ft. Nepaul, 1824. Annual; trailing.



FIG. 84. ANAGALLIS LINIFOLIA, showing Habit and Flowers.

A. linifolia (flax-leaved).* *fl.* brilliant blue, large, about ½in. in diameter. July. *l.* opposite. *h.* 9in. to 12in. Portugal, 1796. Perennial. There are many varieties, the best of which are the following. SYN. *A. Monelli*. See Fig. 84.

A. l. Brewerii (Brewer's).* *fl.* red. June. *h.* 9in. Known also as *Phillipsii*.

A. l. Eugenie (Eugenie's).* *fl.* blue, margined with white.

A. l. lilacina (lilac-flowered). *fl.* lilac. May. *h.* 1ft.

A. l. Napoleon III. (Napoleon's).* *fl.* crimson maroon, distinct and pretty.

A. l. Parksii (Parks'). *fl.* red, large.

A. l. phœnicea (Phœnician).* *fl.* scarlet. May. Morocco, 1803.

A. l. sanguinea (bloody). *fl.* bright ruby colour.

A. l. Wilmoreana (Wilmore's).* *fl.* bright blue purple, with yellow eye. *h.* 6in.

A. Monelli (Monell's). A synonym of *A. linifolia*.

A. tenella (delicate).* *fl.* delicate pink, with deeper veins; corolla bell-shaped. Summer. *l.* roundish, very small, opposite. A beautiful little native bog trailer, and one of the prettiest in the whole genus. Requires a boggy and wet soil.

A. Webbiana (Webb's). *fl.* blue; petals with their tops slightly denticulated. June to August. *l.* several, verticillate. *h.* 4in. Portugal, 1828.

ANAGYRIS (from *ana*, backwards, and *gyros*, a circle; the pods are curved backwards at their extremities). ORD. *Leguminosæ*. An ornamental greenhouse or half-hardy shrub, having the two stipules placed opposite the leaves. It thrives in a mixture of loam, sand, and peat in equal proportions. Young cuttings should be planted in July in a pot of sand, and placed under a hand glass.

A. fœtida (fœtid). *fl.* yellow, hairy, like those of the Laburnum; racemes short. May. *l.* trifoliate; leaflets

lanceolate, acute, entire. *h.* 6ft. to 8ft. South Europe, 1750. This shrub is fœtid in every part when bruised.

ANALOGY. Resembling a thing in form but not in function; or *vice versâ*. Corresponding with a thing in many points, but differing in more, or in points of more importance.

ANANAS (from *nanas*, the South American name for the Pine Apple). SYN. *Ananassa*. Pine Apple. ORD. *Bromeliaceæ*. Stove herbaceous perennials, having the berries collected with the bracts into a compound fruit. Leaves rigid; edges spiny. The variegated form is a useful plant for decorative purposes, and may be employed without the usual harmful consequences attending stove plants generally, but it must not be subjected to cold draughts. The soil should consist of two parts fibrous loam, one of peat, one of dung and leaf mould, and another of sand. Those propagated from suckers, which should be laid by a day or two and then inserted in a strong heat, have, as a rule, longer and lighter-coloured leaves. Offsets are often produced at the base of the fruit, and make stout plants, with high-coloured foliage. When the plants are potted in spring, plunge them in bottom heat, to hasten their growth; but this is not absolutely necessary. Should it be desired to fruit the variegated form, the plants may be submitted to the same process of culture as detailed under **Pine Apple** (which *see*).

A. bracamorensis (Bracamora). Brazil, 1879.

A. bracteata (bracted). *fl.* crimson. April. *h.* 3ft. Brazil, 1820.

A. lucida (shining). *fl.* pink. April. *h.* 3ft. South America, 1820.

A. macrodonta (large-toothed).* *fl.* reddish, tinted buff; spike elongate-ovoid, with imbricating dentate bracts. *fr.* conical, about 8in. long and 4in. wide, with conspicuous bracts, and highly perfumed. *l.* with conspicuous teeth. 1878. SYN. *Bromelia undulata*.

A. Mordilona (Mordilona; native name). *fr.* large, with a fine aroma. *l.* distinguished in being without spines. Columbia, 1869.

A. Porteana (Porter's).* *l.* armed on the margins with sharp spines, deep olive green, with a broad band of pale yellow running down the centre from base to apex. This species has a somewhat erect habit of growth. Philippines, 1866.

A. sativa (cultivated). Pine Apple. For culture, *see* **Pine Apple**.

A. s. variegata (variegated).* *l.* rosulate, finely arched, 2ft. or 3ft. long, serrated on the edges; centre bright green, sometimes with a few lines of white, broadly margined with rich creamy-yellow, tinged with red towards the margins. A very elegant variegated plant for vases, &c.

ANANASSA. *See* **Ananas.**

ANANTHERIX (from *a*, without, and *antherix*, an awn; there are no horn-formed processes from the base of the leaflets of the corona, as in *Asclepias*, to which it is closely allied). ORD. *Asclepiadeæ*. A small genus of pretty, hardy herbs. *A. viridis* is of easy culture in an open situation, and light soil. Increased by division of the root; or by seeds, which ripen in abundance.

> **A. viridis** (green). *fl.* purplish-green, large; corolla sub-campanulate, five-cleft; umbels proceeding from the stem, sub-panicled, few-flowered. August. *l.* opposite, sessile, obovate-oblong, pointed, smoothish. *h.* 1ft. North America, 1812.

ANAPELTIS. Included under *Polypodium*.

ANARRHINUM (from *a*, without, and *rhin*, a snout; the corolla being without a spur, or furnished with a very short one). ORD. *Scrophularineæ*. Elegant little half-hardy biennials or perennials allied to *Antirrhinum*. Flowers small, drooping, in long spike-formed, twiggy, and interrupted racemes. Radical leaves usually in a rosette; stem and branch leaves palmate-parted, or toothed at the apex; superior ones quite entire. They are of easy culture in ordinary garden soil; seed may be sown outside in spring, or they can be increased by growing cuttings, but they require protection during severe weather.

> **A. bellidifolium** (Daisy-leaved).* *fl.* white, or pale blue; racemes slender, elongated. June. *l.* radical ones spathulate or obovate-lanceolate, deeply toothed; branch leaves deeply

three to seven-parted. *h.* 2ft. South Europe, 1629.

A. Duriminium (Douro). A synonym of *A. hirsutum*.

A. fruticosum (shrubby). *fl.* white, without a spur. July. *l.* lower ones mostly tridentate at the apex; superior ones oblong, quite entire. *h.* 2ft. to 3ft. South Europe, 1826. Shrubby.

A. hirsutum (hairy). *fl.* whitish, a little larger than those of *A. bellidifolium*, of which it is, perhaps, only a downy variety. *h.* 1ft. to 2ft. Portugal, 1818. SYN. *A. Duriminium*.

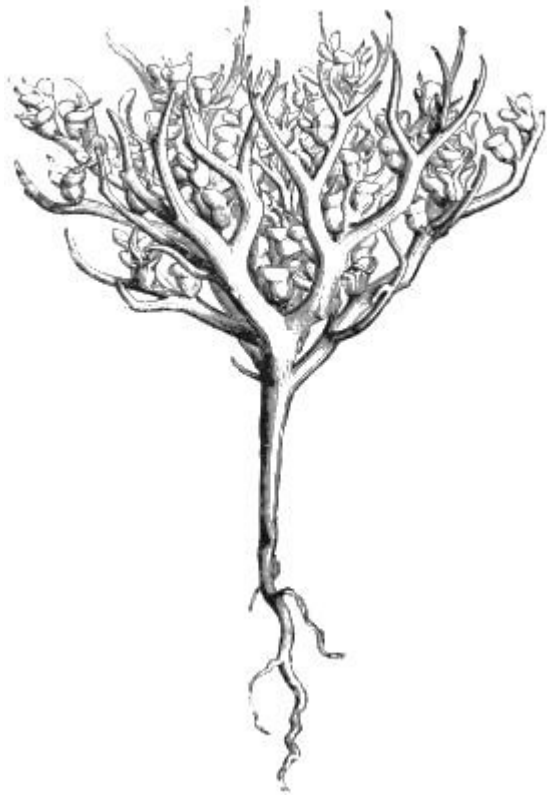


Fig. 85. Dry Fruiting Plant of Anastatica Hierochuntina.

ANASTATICA (from *anastasis*, resurrection; plant recovering its original form, however dry it may be, on immersion in water). Ord. *Cruciferæ*. A very curious and interesting little annual, the leaves of which fall off from the plant after flowering, the branches and branchlets then become dry, hard, and ligneous, and rise upwards and bend inwards at their points. This plant has the remarkable property of resuming vitality on being placed in water, after being kept in a dry state for many years. Seeds should be sown in heat, in the spring, and the plants afterwards potted off and plunged again in heat to

hasten their growth, which cannot otherwise be fully developed with our precarious and sunless summers.



FIG. 86. ANASTATICA HIEROCHUNTINA.

A. Hierochuntina. Rose of Jericho. *fl.* small, white, sessile, disposed in spikes along the branches; petals obovate. July. *fr.*, or silicle, ventricose, with the valves bearing each an appendage on the outer side

at the end. *l.* obovate, with stellate hairs; lower ones entire, upper ones slightly toothed. Branches crowded lattice-wise into a globular form. *h.* 6in. Syria, &c., 1597. Supposed by some commentators to be the "*rolling thing* before the whirlwind" mentioned by Isaiah. See Figs. 85 and 86.

ANASTOMOSE. Branching of one vein into another.

ANBURY. *See* **Ambury.**

ANCEPS. Two-edged; as the stem of an Iris.

ANCHIETEA (named in honour of P. Anchietea, a celebrated Brazilian writer on plants). SYNS. *Lucinœa*, *Noisettia*. ORD. *Violarieœ*. An ornamental, stove, evergreen climber. Petals five, very unequal, two upper ones smallest, two intermediate ones longer, lowest one largest, with a spur at the base. The species thrives in a mixture of loam, sand, and peat. Young cuttings root freely under a bell glass if planted in sand, and placed in a moderate heat.

A. pyrifolia (pear-leaved). *fl.* whitish, veined with red at the base, in axillary fascicles; lower petal obovate. July. *l.* alternate, stalked, stipulate, ovate, acute, crenated. Brazil, 1826.

ANCHOMANES (name of doubtful origin). ORD. *Aroideœ*. A remarkable and beautiful stove tuberous-rooted perennial aroid, allied to *Amorphophallus*, and requiring somewhat similar treatment. As soon as the leaves die down, the plants should be repotted in

rich sandy loam and leaf mould, with ample drainage. They will need scarce any water or attention until growth commences the following spring, when they must have an abundance of water, and a moist atmosphere. Summer temperature, 60deg. to 85deg.; winter, 55deg. to 60deg. Propagated by seeds and offsets.

A. Hookeri (Hooker's).* *fl.*, spathe pale purple, appearing before the leaf, much expanded; spadix whitish; scape prickly, shorter than the petiole. June. *l.*, petiole slender, prickly, bearing on its summit the horizontal blade, about 3ft. in diameter; this is divided into three primary divisions, which are again cut up into several leaflets, the largest of these being toothed. *h.* 3ft. Fernando Po, 1832. There is a variety with a paler coloured spathe. SYN. *Caladium petiolatum*.

ANCHOVY PEAR. *See* **Grias cauliflora**.



Fig. 87. Anchusa capensis, showing Flower and Habit.

ANCHUSA (from *anchousa*, paint for the skin; use of some species). Ord. *Boraginaceæ*. Very pretty hardy annuals, biennials, or perennials. Flowers in scorpoid racemes; corolla funnel-shaped; throat closed by erect, obtuse processes; nuts four, one-celled, inversely conical, with a contraction towards the point, fixed to the bottom of the calyx, perforated and concave at the base. Of easy culture, in ordinary soils, and preferring a sunny situation. Propagated by seeds, which should be sown in early spring in pots of sandy soil, when most of them will germinate in three or four weeks, some less. The honey-bee is very partial to this genus.

A. Agardhii (Agardh's). *fl.* purple,

on short pedicels, distant, disposed in terminal racemes, which are generally conjugate. July. *l.* linear-lanceolate, tubercled, strigose. *h.* 1ft. Siberia, 1820. Perennial. Rare.

A. azurea (blue). Synonymous with *A. italica*.

A. Barrelieri (Barrelier's). *fl.* blue, with a white tube and yellow throat; racemes conjugate, panicled, bracteate. May. *l.* oblong-lanceolate, denticulated, hispid. *h.* 1ft. to 2ft. South Europe, 1820. Perennial. SYNS. *Buglossum Barrelieri*, *Myosotis obtusum*.

A. capensis (Cape).* *fl.* blue; racemes terminal, panicled. July. *l.* linear lanceolate, hispid. Stem simple, hairy. *h.* 1½ft. Cape of Good Hope, 1800. Requires greenhouse protection in winter. Biennial. See Fig. 87.



Fig. 88. Inflorescence of Anchusa italica.

A. italica (Italian). *fl.* bright blue or purple, in panicled racemes. Summer. *l.* lanceolate, entire, shining; radical ones sometimes 2ft. long. *h.* 3ft. to 4ft. Caucasus, &c., 1810. One of the best. Syns. *A. azurea*, *A. paniculata*. See Fig. 88.

A. latifolia (broad-leaved). Synonymous with *Nonnea rosea*.

A. myosotidiflora (Myosotideum-flowered). *fl.* fine blue; throat yellow; raceme terminal, panicled, bractless. July. *l.* large, radical ones on long petioles, reniformly cordate; those of the stem sessile, ovate, hairy. *h.* 1ft. Siberia, 1825. A pretty plant. SYN. *Myosotis macrophylla*.

A. officinalis (officinal). *fl.* blue or purple, sessile, imbricate; spikes joined by pairs, terminal. June to October. *l.* lanceolate, hispid; radical ones tufted. *h.* 1ft. to 2ft. Britain, naturalised here and there.

A. o. incarnata is a variety with flesh coloured flowers.

A. paniculata (panicled). Synonymous with *A. italica*.

A. sempervirens (evergreen). *fl.* rich blue, in short axillary spikes, generally leafy at the base. May. *l.* broadly ovate, lower ones upon long stalks. Stem erect. *h.* 1½ft. to 2ft. Perennial; here and there naturalised in Britain. See Fig. 89.

A. tinctoria (dyers'). Alkanet. *fl.* deep blue; tube blood-colour; racemes usually twin, terminal, many-flowered. June. *l.* oblong, hispid. *h.* 6in. South Europe, 1596. A diffuse perennial.

ANCYCLOGYNE. A synonym of **Sanchezia** (which *see*).

ANDERSONIA (in honour of Messrs. Anderson, surgeons, great promoters of botany). ORD. *Epacridaceæ*. Elegant and delicate little greenhouse shrubs. Flowers terminal, solitary, or spicate; corolla sub-campanulate, hypocrateriform, five-lobed. The undermentioned, which is the only species yet introduced, grows freely in a sandy peat with perfect drainage, which latter is most essential. Cuttings from the tips of young shoots may be made in autumn, winter, or spring, and planted in sand in a gentle heat, with a bell glass placed over them.

A. sprengelioides (Sprengelia-like).* *fl.* pink, furnished with two small bracteas, spicate. March. *l.* spreading, bases curved inwards, so as to resemble a hood, ending in a flat point. *h.* 1ft. to 3ft. New Holland, 1803. Evergreen squarrose shrub. SYN. *Sprengelia Andersoni*.

ANDIRA (its Brazilian name). ORD. *Leguminosæ*. Large ornamental stove evergreen trees, nearly allied to **Geoffroya** (which *see* for cultivation). Flowers in axillary or terminal panicles. Pod drupaceous. Leaves alternate, unequally pinnate.

A. inermis (unarmed). *fl.* purple, on short pedicels; panicles terminal. *l.* impari-pinnate; leaflets thirteen to fifteen, ovate-lanceolate, acute, glabrous on both surfaces. *h.* 20ft. to 30ft. Jamaica, 1773. Known as the Cabbage Tree.

A. racemosa (branchy). *fl.* purple, in panicled racemes. *l.* impari-pinnate;

leaflets thirteen, ovate-oblong, acuminated, glabrous on both surfaces. *h.* 20ft. to 60ft. Brazil, 1818.



Fig. 89. Anchusa sempervirens.

ANDROCYMBIUM (from *aner*, a man, and *cymbos*, a cavity; the stamens are enclosed in a hollow formed by the folding of the limb of the petals). Ord. *Liliaceæ*. A peculiar greenhouse bulbous plant, requiring a light sandy soil, dry atmosphere, no shade, and a season of rest; during the latter period, scarcely any water is required. Propagated by seeds and offsets.

A. punctatum (dotted). *fl.* whitish, few, in a dense sessile umbel, surrounded by about four spreading lanceolate, acuminate leaves, which are 5in. to 6in. long, ½in. to ¾in. broad above the base, channelled

down the centre from base to tip. South Africa, 1874.

ANDRŒCIUM. The male organ of the flower.

ANDROGYNOUS. Producing male and female flowers on the same spike.

ANDROLEPIS (from *aner*, a man, and *lepis*, a scale; referring to the scaly stamens). ORD. *Bromeliaceæ*. Stove evergreen epiphyte. For culture, *see* **Æchmea.**

A. Skinneri (Skinner's). *fl.* white. *h.* 1½ft. Guatemala, 1850. SYN. *Billbergia Skinneri*.

ANDROMEDA (named after the daughter of Cepheus, who was rescued from the sea monster by Perseus). ORD. *Ericaceæ*. A dwarf, hardy shrub, found in peaty bogs in the temperate and Arctic regions of the northern hemisphere. Sow seeds as soon as ripe in pots or pans, very thinly, in sandy peat soil, and place in a cool frame, giving plenty of air. Place the young plants out in spring. Layers, pegged carefully down during September, will generally take twelve months to make sufficient roots to allow of their being separated, and thus become independent plants. For other species often included under this genus in catalogues, *see* **Cassandra**, **Cassiope**, **Leucothoë**, **Lyonia**, **Oxydendrum**, **Pieris**, and **Zenobia**.

A. polifolia (Polium-leaved). Wild Rosemary. *fl.* pinky white, drooping, sometimes tipped with red; corolla ovate, furnished with ovate, rather leafy imbricated bracteas, terminal, umbellate. June. *l.* linear-lanceolate,

mucronulate, with the margins more or less revolute, quite entire, glaucous beneath, with an elevated rib, and reticulated veins. *h.* 1ft. The numerous varieties of this very beautiful native shrub principally differ in the colouring of the flowers.

ANDROPOGON (from *aner*, a man, and *pogon*, a beard; tufts of hair on flowers). ORD. *Gramineæ*. A large genus of grasses with polygamous flowers. The majority of species are of no horticultural value; several, however, are very ornamental subjects, and thrive well in a rich, deep soil. Easily propagated by seeds or by division of the roots. The South European kinds succeed in the open air if planted in a warm dry border.

A. citratum (Citrus-leaved). Synonymous with *A. Schœnanthus*.

A. Schœnanthus. Lemon Grass. *fl.* in threes; spikes imbricate, conjugate, panicled. A handsome species, the leaves of which emit a very fragrant odour when bruised. *h.* 2ft. India, 1786. Stove species. SYN. *A. citratum*.

Other species worth growing are *furcatus*, *halepensis*, *muricatus*, *pubescens*, *scoparius*, *squarrosus*, and *strictus*.

ANDROSACE (from *aner*, a man, and *sakos*, buckler; in reference to the resemblance of the anther to an ancient buckler). Including *Aretia*. ORD. *Primulaceæ*. Dwarf annuals or perennials, entirely alpine, agreeing in most characters with *Primula*, but having

the tube of the corolla narrowed at the mouth. An airy, well-drained, and partially sunny position is essential in their culture. They thrive well between fissures of rocks or stones with a rich sandy peat soil. Drought and a sour soil are alike fatal, and both will be greatly obviated if small pieces of sandstone are mixed with the soil. The woolly species are best arranged beneath a jutting ledge of the rockery, which will afford them protection from the hottest sunshine, and from excessive wet in winter; additional comfort will be provided from the latter ill if a piece of glass is placed over them during the autumn and winter months. They can also be well grown, and make charming little specimens, in pots, with rich sandy soil and thorough drainage. Sprinkle sand among the small rosettes of leaves. They are increased by divisions, cuttings, or seed; the latter should be sown as early as possible, and raised in a frame.

A. alpina (alpine). *fl.* purplish rose; throat and tube yellow, solitary; peduncles about ½in. long. June. *l.* crowded, small, tongue-shaped, in small rosettes. *h.* 2in. to 3in. Switzerland, 1775. This species requires a rather shady aspect, and to be planted almost perpendicularly in a soil composed of leaf mould, peat, fibrous loam, and sharp sand. SYN. *A. glacialis*.

A. Aretia (Aretius'). Synonymous with *A. helvetica*.

A. aretioides (Aretia-like). Synonymous with *A. obtusifolia*.

A. argentea (silvery).* *fl.* white, sessile, very numerous. June. *l.* densely imbricated, lanceolate, oblong, covered with short hairs, forming very pretty silvery-grey rosettes. *h.* about 2in. Switzerland, 1826. This requires a well drained, sunny fissure. SYN. *A. imbricata*.

A. carnea (flesh-coloured).* *fl.* pink or rose, with a yellow eye, three to seven, on hairy stalked umbels. July. *l.* awl-shaped, smooth, acuminated, not forming rosettes. Stem somewhat elongated. *h.* 3in. or 4in. Switzerland, 1768. This forms charming little cushions if allowed to remain undisturbed; it is easily increased. SYNS. *A. Lachenalii*, *A. puberula*.

A. c. eximia (select).* Larger and more robust than the typical species, and a more rapid grower. Forms compact tufts of dense rosettes, bearing heads of rosy-crimson yellow-eyed flowers, on stems 2in. or 3in. high. Auvergne Alps, 1871. It requires moist sunny ledges and fissures of rockwork in peat, loam, and sand.

A. Chamæjasme (rock jasmine).* *fl.* blush, ultimately deep pink, with a yellow eye, umbellate. June. *l.* lanceolate, tapering to a point towards the base, in comparatively large, not dense, rosettes. *h.* about

2in. to 4in. Austria, &c., 1768. A very free flowering species, growing freely when established, ultimately forming large tufts. It thrives best in a deep, well drained and rich loam soil.

A. ciliata (ciliated). *fl.* deep carmine red, on stems double as long as the leaves. June. *l.* lanceolate-oblong, smooth on both surfaces, with ciliated margins, imbricated. *h.* 2in. to 3in., forming dense cushions. Pyrenees.

A. coronopifolia (buckhorn-leaved).* *fl.* pure white, on slender pedicels, umbellate on peduncles, about 6in. high. April to June. *l.* lanceolate, distantly serrated, smooth, in flattish rosettes. Russia, 1755. This is a charming little biennial, well worthy of a place on the rockery. A colony of it is extremely pretty; it seeds freely, and a batch of young plants almost invariably takes the place of the old ones. SYN. *A. septentrionalis*.

A. glacialis (glacial). Synonymous with *A. alpina*.

A. helvetica (Swiss).* *fl.* white, nearly sessile, with a yellow eye, larger than the little rosettes of leaves on the stalk from which they spring. May. *l.* lanceolate, obtuse, closely imbricated, small, ciliated. *h.* 1in., forming dense cushions.

Switzerland, 1775. A rare little gem, requiring a partially shaded position, and very sandy soil. SYN. *A. Aretia*.

A. imbricata (imbricated). Synonymous with *A. argentea*.

A. Lachenalii (Lachenal's). Synonymous with *A. carnea*.

A. lactea (milk-white).* *fl.* pure white, with yellow throat, large, on long graceful stalks, umbellate. June. *l.* linear, or nearly so, in rosettes, sometimes scattered on the elongated branches. *h.* about 4in. Austria, 1752. Very floriferous and strong growing. Should have an eastern or western aspect, and be propagated from seeds. SYN. *A. pauciflora*.



FIG. 90. ANDROSACE LAGGERI.

A. Laggeri (Lagger's).* *fl.* pink,

sessile; when approaching maturity the stem becomes elongated, and bears a tuft of stalked flowers. March. *l.* awl-shaped, sharply pointed, in tiny rosettes. *h.* 3in. Pyrenees, &c., 1879. Very like *A. carnea*, but more delicate, earlier, and more abundant flowering, with deeper green foliage. It suffers from exposure to the sun, and therefore requires a partially shady position. Should be propagated from seeds or cuttings, which latter strike freely. See Fig. 90.

A. lanuginosa (woolly-leaved).* *fl.* delicate rose, with a small yellow eye, umbellate. June to October. *l.* nearly 1in. long, clothed with shiny silken hairs. *h.* 6in. to 9in. Himalaya, 1842. A very beautiful species, with spreading or trailing shoots, easily multiplied by cuttings or layers. It requires a warm sunny spot on the rockery, with a sandy peat soil. When planted so that its shoots drape the face of a rocky ledge, it is one of the most charming plants possible to grow.

A. obtusifolia (blunt-leaved). *fl.* white or rose, with yellow eye; umbels five or six-flowered. Spring. *l.* lanceolate or rather spathulate, in rather large rosettes. Stems downy. *h.* 2in. to 6in. European Alps. A very pretty form, closely allied to *A.*

Chamæjasme, and differing principally in its somewhat larger rosette of leaves and stronger growth. SYN. *A. aretioides*.

A. pauciflora (few-flowered). Synonymous with *A. lactea*.

A. penicillata (finely hairy). Synonymous with *A. villosa*.

A. puberula (puberulous). Synonymous with *A. carnea*.

A. pubescens (downy). *fl.* white, with a faint yellow eye, solitary, at the ends of the branchlets, very numerous. June. *l.* oblong-ovate, ciliated, in a crowded rosette. Stem with a small swelling close to the flower. *h.* 2in. Alps, 1869. Treat like *A. Chamæjasme*.

A. pyrenaica (Pyrenean). *fl.* white, with yellowish eyes, on a scape about ¼in high. Summer. *l.* narrow-oblong, ciliated, recurved, keeled at the back. *h.* 1in. Pyrenees. An exceedingly pretty and diminutive little alpine plant, grown, according to Mr. Robinson, "to great perfection in fissures between large rocks, with, however, deep rifts of sandy peat and loam in them. It will also grow on a level exposed spot, but in such a position should be surrounded by half-buried stones."

A. sarmentosa (trailing).* *fl.* bright rose, with a white eye, in umbels of

ten to twenty, on an erect scape. May and June. *l.* very silvery, forming dense rosettes, whence spring a number of runners, bearing at their extremities other tufts, which should be pegged down and covered with soil, when they will root freely. Himalayas, 1876. It requires rich sandy loam, a sunny position, and to be wedged between pieces of sandstone. Cover the rosettes during winter with a sheet of glass. See Fig. 91.

A. septentrionalis (northern). Synonymous with *A. coronopifolia*.

A. villosa (hairy).* *fl.* rose or blush, with a deeper coloured eye, and a honey-like perfume, umbellate. May. *l.* narrow, oblong, covered with soft white down, chiefly on the under surface, in compact tufts. *h.* 2in. to 4in. Pyrenees, &c., 1790. When well grown, the flowers are produced in great abundance, almost covering the green cushions. Plant in a sunny fissure of the rockery, in sandy loam and leaf soil. SYN. *A. penicillata*.



Fig. 91. Androsace sarmentosa, showing Habit, and the two kinds of Leaves, &c.

A. Vitaliana (Vital's).* *fl.* rich yellow, comparatively large; tube inflated at the middle, almost nestling among the leaves. May to July. *l.* linear, acute, greyish. Stems numerous. *h.* 1in. to 2in. Pyrenees, &c., 1787. When well grown, it produces flowers in abundance, and is the only species in cultivation having yellow flowers. A well-drained, sunny pocket is desirable, with a calcareous soil, covering the surface with nodules of sandstone. Syn. *Gregoria Vitaliana.*

A. Wulfeniana (Wulfen's).* *fl.* rosy or crimson, large. Summer. *l.* oval,

acuminated, in dense rosettes. *h.* 2in. Styria. A very rare species in cultivation in this country.

ANDROSÆMUM. *See* **Hypericum**.

ANDROSTEPHIUM (from *aner*, a man, and *stephos*, a crown; some of the stamens are barren and petaloid, forming a corona). ORD. *Liliaceæ*. A very pretty little hardy bulb, of dwarf habit, allied to *Brodiæa*. It requires a rich sandy loam, in a sunny position, and may be propagated by offsets and seeds; the latter should be sown as soon as ripe in a cold frame. Plant 6in. deep, when it will require no protection in winter.

A. violaceum (violet). *fl.* violet blue, about 1in. long, three to six in an umbel, on pedicels about their own length; tube infundibuliform, about as long as the spreading segments; corona half as long. Spring. *l.* four to six, very narrow. *h.* 6in. Texas, 1874.

ANDRYALA (the meaning of this is unknown). ORD. *Compositæ*. These are pretty half-hardy evergreen herbaceous perennials, easily grown in ordinary well-drained garden soil. Increased by seeds and divisions in spring. Two species only are in cultivation.

A. lanata (woolly).* *fl.-heads* yellow, Hieracium-like. May. *l.* white, woolly, thick, oblong-ovate; radical ones stalked; upper ones sessile. Stems with a leaf at each joint. *h.* about 1ft. South Europe, 1732.

A. mogadorensis (Mogador). *fl.-heads* bright yellow, as large as a half-crown; disk bright orange. April. Morocco, 1871. This species is rare in cultivation.

ANEILEMA (from *a*, not, and *eilema*, involucre; in reference to the absence of the involucre). ORD. *Commelynaceæ*. Greenhouse and stove evergreen perennials, with generally a trailing habit. A genus resembling *Commelyna*, from which it is distinguished by the inflorescence being sub-paniculate, and the peduncles entirely exserted from the bracts at the branching of the panicle. Flowers without any involucre. They thrive in a compost of loam, peat, leaf mould, and sand, well mixed. Increased by seeds and root divisions. There are a large number of species known to botanists.

A. biflora (two-flowered).* *fl.* blue; floral stalks two-flowered. July. *l.* lanceolate. Stem creeping; plant smooth. New Holland, 1820. Greenhouse species.

A. sinicum (Chinese). *fl.* pale blue; racemes about seven-flowered, alternate, placed in a panicle form. May. *l.* ligulate, acuminate. Stems branched, diffuse. *h.* 1ft. China, 1820. Greenhouse species.

ANEMIA (from *aneimon*, naked; in reference to the naked panicles of sporangia). Including *Anemidictyon*. ORD. *Filices*. A well-marked genus of stove and greenhouse ferns, chiefly confined to Tropical America. Capsules small, very abundant, forming a

copiously-branched panicle, quite distinct from the leafy part of the frond. This genus of handsome dwarf-growing ferns is of easy culture, in a compost of fibrous peat, leaf soil, and sand. Several species are exceedingly pretty for fern cases. For general culture, *see* **Ferns**.

A. adiantifolia (maidenhair-leaved).* *sti.* 12in. to 18in. long, firm, naked. *fronds*, barren portion shortly-stalked, 6in. to 9in. long, 4in. to 6in. broad, deltoid, bi-tripinnate; pinnæ close, lanceolate, the lowest the largest; ultimate divisions oblong or linear-cuneate, the outer toothed, with a firm texture; panicle 3in. to 4in. long, the peduncle 1in. to 3in. long. West Indies, 1793. A very handsome stove fern.

A. ciliata (ciliated). Synonymous with *A. hirsuta*.

A. collina (hill). *sti.* 8in. to 12in. long, firm, erect, densely clothed with fine ferruginous hairs. *fronds*, barren portion sessile, 6in. to 12in. long, 2in. to 3in. broad, with about twelve sessile pinnæ on each side, which are 1in. to 1½in. long, and about ½in. broad, unequal-sided, obliquely-truncate below, blunt, sub-entire, with a sub-coriaceous texture; panicle 2in. to 3in. long, close, the peduncle 4in. to 6in. long. Brazil, 1829. Very rare stove species. SYN. *A. hirta*.

A. deltoidea (deltoid-like). Synonymous with *A. tomentosa*.

A. Dregeana (Drege's).* *sti.* 8in. to 12in. long, firm, slightly villose. *fronds*, barren portion sub-sessile, 8in. to 12in. long, 2in. to 3in. broad, about equal in width in the lower half, with eight to twelve pinnæ on each side, which are 1in. to 1½in. long, ½in. to ¾in. broad, ovate-deltoid, unequal at the base, the upper side sub-cordate, the edge inciso-crenate; panicle 3in. to 4in. long, the lower branches elongated; peduncle same length. Natal. Stove species.

A. flexuosa (wavy). Synonymous with *A. tomentosa*.

A. hirsuta (hairy). *sti.* 6in. to 12in. long, slender, naked. *fronds*, barren portion 2in. to 6in. long, 1in. to 3in. broad, sessile, oblong-deltoid, bipinnatifid; pinnæ in six to eight opposite pairs, 1in. to 1½in. long, ¼in. to ¾in. broad, varying from oblong, obtuse, sub-entire, truncate at the base on the lower side, to deeply pinnatifid with narrow divisions; panicle 1in. to 2in. long, close; peduncle 2in. to 6in. long, slender. Jamaica, 1704. Very handsome stove species. SYNS. *A. repens* and *A. ciliata*.

A. hirta (hairy). Synonymous with *A. collina*.

A. mandioccana (Mandioccan).* *sti.* 6in. to 12in. long, deciduously villose. *fronds*, barren portion 1ft. or more long, 2in. to 4in. broad, oblong-lanceolate, the lower half about equal in width; pinnæ in twenty or more close pairs, the point narrowed, but scarcely acute; edge finely serrulate, the upper base parallel with the stem, the lower obliquely truncate; rachis and surfaces finely pilose; texture sub-coriaceous; panicle very compound, 3in. to 4in. long: peduncle longer. Brazil. A very beautiful and distinct stove species.

A. Phyllitidis (Phyllitis-like).* *sti.* 6in. to 18in. long, stramineous, naked, or fibrillose. *fronds*, barren portion sessile, 4in. to 12in. long, 2in. to 8in. broad, ovate-oblong, simply pinnate; pinnæ in four to twelve sessile pairs, the lowest the largest, ovate, 1in. to 6in. long, ½in. to 2in. broad, the apex acute, the edge crenulate, the base rounded or cuneate, or unequal, with a firm texture; panicle dense, 3in. to 9in. long, the branches short; peduncles the same length. Cuba, Mexico, &c. SYN. *Anemidictyon Phyllitidis*. Greenhouse species.

A. P. lineata (lined). *fronds* with a yellowish-green central stripe down the pinnæ. South America, 1868.

A. P. plumbea (leaden). Synonymous with *A. P. tessellata*.

A. P. tessellata (tessellated). Pinnæ dark green, with bright green centre and leaden-grey border. Brazil, 1875. The forms of this species are numerous: *fraxinifolia* and *macrophylla* are names often met with, but only show slight deviations. They all have a more hardy constitution than the other species, and grow well in the greenhouse. SYN. *A. P. plumbea*.

A. repens (creeping). Synonymous with *A. hirsuta*.

A. tomentosa (tomentose).* *sti.* 6in. to 12in. long, strong, erect, clothed with ferruginous hairs. *fronds*, barren portion 6in. to 12in. long, half as broad, ovate-deltoid, bipinnatifid or bipinnate; lowest pinnæ the largest, the blunt lobes ½in. to ¾in. long, ¼in. broad, nearly entire; rachis and surfaces densely pilose, with a firm texture; panicle 4in. to 9in. long, loose; peduncle 1in. to 2in. long. Tropical America. Greenhouse species. SYNS. *A. deltoidea*, *A. flexuosa*, *A. villosa*.

A. villosa (hairy). Synonymous with *A. tomentosa*.

ANEMIDICTYON. *See* **Anemia.**

ANEMONE (from *anemos*, wind; the greater part of

the species grow in elevated places, much exposed to the wind). Wind Flower. ORD. *Ranunculaceæ*. An extensive genus of very ornamental hardy perennials. The generic characters of Anemone proper are: Involucre of three cut leaflets, distant from the flower; calyx of five to twenty petal-like sepals; petals absent. Of sub-genus Hepatica: Involucre of three entire leaflets, just under the flowers; calyx of six to nine petal-like sepals; petals absent. For botanical purposes, they are both now included under the one generic name of Anemone; but in gardens the Hepaticas are frequently regarded as a distinct genus. They delight in a rich sandy loam, but most will thrive in ordinary garden soil. Some are suitable for borders, while others thrive best on the rockery, most of them preferring a damp and partially shady position. For the numerous varieties of *A. coronaria*, both double and single flowered, the soil can hardly be too rich, and the position, though open, should be a sheltered one, and well drained. The tubers may be planted early in October, about 6in. apart, and 3in. deep, various colours being intermixed, when a splendid effect is produced in the following spring. After flowering, the tubers should be taken up—say in June—and spread out thinly, in a shady, airy situation, until they are dry, when they should be thoroughly cleaned, and, if necessary, divided, and finally stored away in a cool place, in pots or boxes of dry sand until the planting season. Anemones make admirable pot plants if placed in a compost of two parts turfy loam, and one of leaf mould or rotten hotbed or cow manure, with about a sixth part of sharp gritty sand; but, if so grown, they should be protected through severe weather, and brought into warmth as required. The herbaceous species are propagated by root divisions or root

cuttings, or by seeds, in autumn or early spring; the seeds are better sown as soon as ripe in pans in a cold frame. Some, such as *A. japonica*, are freely increased by division; while others, such as *A. narcissiflora*, are very slow; and the tuberous rooted ones, by root division and seeds. The best and most rapid means of propagating the invaluable varieties of *A. coronaria*, and also of obtaining new ones, is by seed. A careful selection of flowers, and skilful hybridising, will produce results commensurate with the trouble incurred. So soon as the seed ripen, they should be gathered and sown at once in a warm sheltered situation outside, or in pans under glass, covering lightly with sandy soil, and keeping moist. They are somewhat difficult to sow on account of a mass of cotton-like down which adheres closely to them; they should be thoroughly separated therefrom by rubbing them in dry sand. Of course, if the seed are sown at different times, plants will be produced which will flower at different periods, and a succession of bloom may be had from April to November—indeed, nearly all the year.

A. alba (white). *fl.* white; pedicel solitary; sepals five, obovate, very blunt. June. *l.* ternate or quinate; segments deeply toothed at top; those of the involucre stalked. *h.* 6in. Siberia, 1820.

A. alpina (alpine).* *fl.* variously coloured, sometimes white, white with the back purple, cream, yellowish or yellow with their backs paler; sepals six, spreading, elliptical, rarely ovate. May. *l.* sometimes smooth, sometimes

clothed with long crowded silky hairs, biternate; segments pinnate and deeply serrated; involucre of the same form. *h.* 6in. Middle Europe, 1658. Very handsome alpine. Plant on the rockery in rich deep soil, with a damp situation. SYN. *Pulsatilla alpina*.

A. a. sulphurea (sulphur).* *fl.* beautiful soft yellow, 2in. to 2½in. across when expanded, but they are usually cup-shaped; sepals six, covered with a silky down outside; anthers of a rich golden colour. May and June. *l.* radical, stalked, drooping, more than 1ft. long; leaflets pinnatifid, deeply toothed. A very beautiful form, thriving in ordinary garden soil, and a rather moist situation. See Fig. 92.

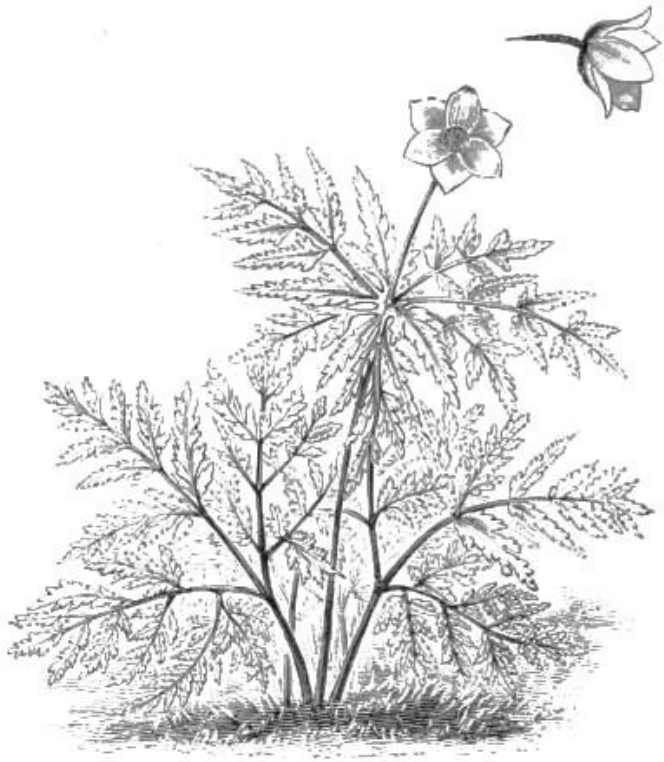


Fig. 92. Anemone alpina sulphurea, showing Habit and Flower.

A. americana (American). A synonym of *A. Hepatica*.

A. angulosa (angled).* *fl.* fine sky blue, over 2in. across, with numerous black anthers surrounding a tuft of yellow styles; sepals eight to nine, elliptical, spreading. February. *l.* palmately five-lobed; lobes serrated. *h.* 8in. to 12in. East Europe. A very fine species, twice the size of *A. Hepatica* in all its parts;

it is well suited for the border or rockery, enjoying a deep rich soil. SYN. *Hepatica angulosa*.

A. apennina (Apennine).* *fl.* blue, 1½in. across; sepals ten to fourteen, oblong, obtuse, erect; pedicel one-flowered. March. *l.* binately pinnate; segments lanceolate, deeply-toothed, acute. *h.* 6in. England (naturalised here and there), and Southern Europe. An exceedingly pretty plant, with soft-looking feathery foliage. It thrives best under the partial shade of trees, where the flowers retain their colour longer. Tuberous rooted.

A. baldensis (Mount Baldo).* *fl.* white, clothed with adpressed hairs on the outside, and reddish tinged with blue; sepals eight to ten, oblong-oval; pedicels one-flowered. May. *l.* biternate; segments many-parted; lobes linear; involucral leaves multifid. *h.* 6in. Switzerland, 1792. *A. cœrulea* is probably identical with this species. Shady parts of the rockery. Rare. Tuberous rooted.

A. blanda (fair).* *fl.* deep blue, nearly 2in. across; sepals nine to fourteen, narrow. Winter or early spring. *l.* triternate; segments deeply cut and acute; involucral leaves stalked, trifid, deeply cut. *h.* 6in. Eastern Europe. A very handsome early flowering plant. It requires a

rich, light, and well drained sandy loam, and a warm, sheltered position. It closely resembles *A. apennina*, of which it is merely a form, with deeper blue flowers. Tuberous rooted.

A. caroliniana (Carolina). *fl.* purple or whitish, pubescent on the outside, on a long one-flowered pedicel; sepals ten to twenty, oblong-linear. May. *l.* ternate, with three-parted, or cut acutely-toothed lobes; involucral leaves trifid, with cut lobes. *h.* 9in. Carolina, 1824. A very slender and delicate plant. Shady parts of the rockery. Tuberous rooted.

A. cernua (drooping). *fl.* somewhat drooping, dark purple; sepals six, spreading, elliptical-oblong. May. *l.* pinnate, villous underneath; segments pinnatifid; lobes cut, oblong; scapes, petioles, and peduncles clothed with downy hairs. *h.* 6in. Japan, 1806. Rare.

A. coronaria (garland).* Poppy Anemone. *fl.* very various in colouring, solitary; sepals six, oval, approximate. April to May. *l.* ternate; segments multifid; lobules linear, mucronated; involucral leaves sessile, multifid. South Europe, 1596. This is one of the species from which the majority of "florists' varieties" have originated, which can be purchased at such a cheap rate,

either in named varieties, or in mixture, and are invaluable for spring flowering. It thrives best in a good loamy soil, and should be somewhat shaded from the mid-day sun. Tuberous rooted. See Fig. 93.



Fig. 93. Anemone coronaria flore-pleno.



FIG. 94. ANEMONE FULGENS.

A. decapetala (ten-petaled).* *fl.* cream white or pale sulphur, about 1in. to 2in. across, erect; sepals eight to twelve, oblong, spreading. May to June. *l.* tripartite, and freely divided into numerous linear-acute segments, of a deep green colour. *h.* 12in. to 18in. North-West America, &c. A pretty free-flowering species, suitable for naturalising in woods, &c. It is less ornamental than many others, but is very distinct.



Fig. 95. Anemone Hepatica.

A. dichotoma (forked).* *fl.* white, with a tinge of red on the under side; sepals five, elliptical; pedicels many, usually bifid. May. *l.* three parted; lobes oblong, deeply-toothed at top; those of the involucrum sessile. *h.* 1½ft. Siberia, North America, &c., 1768. Border, or for naturalising in woods. Syn. *A. pennsylvanica.*



Fig. 96. Flower and Leaf of Anemone Japonica.

A. fulgens (shining).* *fl.* of a dazzling vermilion or scarlet, with a black central patch of stamens, about 2in. across; sepals obovate. May. Greece, South Europe, &c., 1865. A very beautiful variety, much more showy than *A. hortensis* (of which it is generally regarded as a variety), and a universal favourite. In "Hardy Perennials," Mr. Wood says of this splendid species: "It may be grown in pots for conservatory or

indoor decoration. It needs no forcing for such purposes; a cold frame will prove sufficient to bring the flowers out in winter. Borders or the moist parts of rockwork are suitable for it; but perhaps it is seen to greatest advantage in irregular masses in the half shade of trees in front of a shrubbery; and, after all, it is impossible to plant this flower wrong as regards effect. To grow it well, however, it must have a moist situation and good loam." See Fig. 94.

A. Halleri (Haller's).* *fl.* purplish inside, large, erect; sepals six, oval-lanceolate. April. *l.* pinnate, very villous; segments three parted; lobes with lanceolate-linear, acuminated divisions. *h.* 6in. Switzerland, 1816. A sunny border or the rockery. SYN. *Pulsatilla Halleri*.

A. Hepatica (supposed remedy for liver diseases). Common Hepatica. *fl.* usually blue; sepals six to nine. February. *l.* cordate, three-lobed; lobes quite entire, ovate, acutish; petioles and scapes rather hairy. *h.* 4in. to 6in. There are numerous varieties of this species. England, &c. SYN. *Hepatica triloba*. Varieties: *alba* has large pure white flowers; *cærulea* (blue), the double form of *cærulea* is scarce and very showy; *rubra* produces reddish-pink flowers, and

of which there is also a double variety, very bright and lasting; *Barlowi* has large sky-blue flowers. Besides these there are many others. They are all charming early spring-flowering plants, preferring rich light soil, and to remain undisturbed for years, when they form grand clumps, often producing seedlings where they stand. SYN. *A. americana*. See Fig. 95.

A. Honorine Jobert (Honorine Jobert). Synonymous with *A. japonica alba*.

A. hortensis (garden). Nearly approaches *A. coronaria*, the parent of a large number of garden forms. *A. fulgens* and *A. stellata* are by competent authorities placed as varieties.

A. Hudsoniana (Hudson's). Synonymous with *A. multifida*.

A. japonica (Japanese).* *fl.* rosy carmine, from 2in. to 2½in. across, on footstalks which spring from a whorl of three or four leaves; anthers golden yellow. Autumn. *l.* ternate, with unequally lobed, toothed segments. *h.* 2ft. to 3ft. Japan, 1844. See Fig. 96.



FIG. 97. ANEMONE JAPONICA ALBA.

A. j. alba (white).* This is a splendid variety, with a profusion of large pure white flowers, which are produced from August to November. This white form is one of the handsomest of border flowers. The blooms are 2in. to 3in. across, with a centre of dense lemon coloured stamens. For cutting purposes the flowers are invaluable. It thrives best in deep soil. SYN. *A. Honorine Jobert.* See Fig. 97.

A. j. elegans (elegant).* Very like *A. japonica*, with broader leaves, and pale rose-coloured flowers, which are more than 3in. across. This is also called *rosea* and *hybrida*. Japan.

A. lancifolia (lance-leaved). *fl.* white; sepals five, ovate-acute; scapes one-flowered. May. *l.* all stalked, ternate; segments lanceolate, crenate-toothed. *h.* 3in. Pennsylvania, 1823. Very rare. Rockery. Tuberous rooted.

A. multifida (many-cleft).* *fl.* red, whitish yellow, or citron colour, small; sepals five to ten, elliptical, obtuse; peduncles three, one-flowered, one of which is naked and earlier, the other two longer, and bearing two-leaved multifid involucels on their middle. June. *l.* radical ones ternate; segments cuneated, three parted, multifid, with linear lobes; those of the involucrum multifid, on short petioles. *h.* 6in. to 12in. North America. Border or rockery. SYN. *A. Hudsoniana*.



Fig. 98. Anemone narcissiflora, showing Habit and Flower.

A. narcissiflora (Narcissus-flowered).* *fl.* usually cream coloured, sometimes purplish on the outside; umbels generally many-flowered; pedicels in some instances twice or three times longer than the involucrum, and in others very short; sepals five or six, ovate or oval, blunt or acute. May. *l.* radical ones palmately three to five parted; lobes deeply toothed; lobules linear, acute; those of the involucrum three to five cleft. *h.* about 1ft. Europe, North America, 1773. An extremely variable and beautiful species. Rockery. See Fig. 98.

A. nemorosa (grove).* Wood

Anemone. *fl.* generally white; sepals six, elliptical; scapes one-flowered. March. *l.* ternate; segments trifid, deeply toothed, lanceolate, acute; involucral leaves stalked. *h.* 6in. This species varies greatly in the colour of its flowers. It is a most beautiful little plant, frequent in our native woods, and suitable for planting in shaded shrubberies, &c. Tuberous rooted.

A. n. cœrulea, (blue),* from the North-west States of America, is very near, if not identical with, the variety *Robinsoniana*, of our native woods.

A. n. flore-pleno (double-flowered).* *fl.* pure white, over 1in. across, solitary, double. This is an exceedingly pretty plant, and remains in beauty considerably longer than the type. It should be grown in large clumps, and in rich loam.

A. n. Robinsoniana (Robinson's).* *fl.* bright azure blue, large, over 1½in. in diameter. A charming variety for the rockery or border, and one of the prettiest in the whole genus.

A. n. rosea (rosy).* A very pretty form, with rose-coloured flowers, of which there is a double flowered sub-variety; there is also a double form of the type, named *bracteata fl.*-

pl., white flowers, surrounded with a large involucrum.

A. obtusiloba (blunt-lobed-leaved). *fl.* cream coloured; sepals five, obovate; peduncles two to three, one-flowered, villous, naked, or the lateral ones are bracteate. June. *l.* three lobed cordate, and are, as well as petioles, very villous; segments broadly cuneated, and deeply crenate; involucral leaves trifid. Himalaya, 1843. This species requires a warm and sheltered position.

A. palmata (palmate).* *fl.* golden yellow; sepals ten to twelve, oblong, obtuse; scape one, rarely two, flowered. May. *l.* cordate, sub-orbicular, bluntly three to five-lobed, toothed; involucral leaves trifid. South-west Europe, 1597. A white flowered variety, though scarce, is in cultivation, and is very pretty. True alpines, which should be grown on the rockery, where the soil is both rich and deep, with a somewhat damp situation. Tuberous rooted.

A. patens (spreading).* *fl.* purplish, or rarely yellow, erect, spreading, in the involucre almost sessile; sepals five to six. June. *l.* pinnate, rising after the flowers; segments three parted; lobes toothed at the top. Northern Europe, &c., 1752.

A. p. Nuttalliana (Nuttall's).* *fl.*

purple, sometimes cream coloured, erect, villous on the outside; sepals five or six, erect, connivent. June. *l.* three parted; segments cuneate, trifid, cut; lobes linear-lanceolate, elongated; those of the involucre with linear lobes. *h.* 1ft. North America, 1826. A pretty border plant.

A. pavonina (peacock). Synonymous with *A. stellata*.

A. pennsylvanica (Pennsylvanian). Synonymous with *A. dichotoma*.

A. pratensis (meadow).* *fl.* dark purple, pendulous; sepals six, erect, reflexed at the top, acute. May. *l.* pinnate, many parted; lobes linear. *h.* 6in. to 12in. Northern Europe, &c., 1731. Differs chiefly from the following species in having smaller flowers, sepals narrower and more acute, connivent at base, and reflexed at apex. SYN. *Pulsatilla pratensis*.

A. Pulsatilla (common Pulsatilla).* Pasque Flower. *fl.* generally violet, sub-erect; sepals six, spreading, externally silky, very handsome. April. *l.* pinnate; segments many parted; lobes linear. *h.* 6in. to 12in. England, &c. A singular and beautiful species, thriving best in a dry situation and well-drained soil of a calcareous nature. It is a very pretty plant for a border or rockery;

when well grown, it forms handsome tufts, and flowers very freely. See Fig. 99. SYN. *Pulsatilla vulgaris*. There are numerous varieties, the best of which are:

A. P. dahurica (Dahurian). *fl.* erect; sepals oblong, very villous. Plant dwarf. Sunny border or rockery.



FIG. 99. ANEMONE PULSATILLA.

A. P. lilacina (lilac). *fl.* lilac.

A. P. rubra (red). *fl.* erect; sepals

blunter. Plant dwarfer.

A. ranunculoides (Ranunculus-like).* *fl.* usually yellow (but in the Pyrenean variety purple), generally solitary, single or double; sepals five to six, elliptical. March. *l.* radical ones three to five parted; segments subtrifid, deeply toothed; those of the involucrum on short stalks three parted, deeply toothed. *h.* 3in. Naturalised in English woods, but rarely. Tuberous rooted.



FIG. 100. ANEMONE STELLATA.

A. rivularis (river).* *fl.* white; anthers purple; sepals five, oval, smooth; pedicels three, one of which is naked. April. *l.* villous, as well as petioles, three parted; lobes cuneated, trifid; lobules cut, acutely toothed. *h.* 1ft. to 2ft. North India, 1840. Should be grown on the banks of running water, or in a damp situation in the border.

A. sibirica (Siberian). *fl.* white; sepals six, orbicular; scapes one-flowered. June. *l.* ternate; segments deeply toothed, ciliated, those of the involucrum on short stalks, ternate; segments lanceolate. *h.* 6in. Siberia, 1804. Rockery; very rare.

A. stellata (star-leaved).* *fl.* purple, or rose red, or whitish, solitary; sepals ten to twelve, oblong, bluntish. April. *l.* three parted; lobes cuneated, deeply-toothed; involucral leaves sessile, oblong. *h.* 8in. to 10in. South Europe, 1599. A pretty and gay spring flowering plant. Tuberous rooted. SYN. *A. pavonina*. Double forms of this occur in cultivation. See Fig. 100.



Fig. 101. Anemone sylvestris.

A. sylvestris (wood).* Snowdrop Windflower. *fl.* pure satin white, slightly drooping, 1½in. across when fully open, fragrant; sepals six, elliptical; pedicel solitary. April. *l.* ternate or quinate, hairy beneath; segments deeply toothed at top, those of the involucrum stalked. *h.* 6in. to 18in. Europe, 1596. This

distinct and showy species thrives best in a light vegetable soil in a rather shady and moist situation. The roots are creeping, and should be allowed plenty of room, so that they may ramble without check. See Fig. 101.



Fig. 102. Anemone vernalis.

A. trifolia (three-leaved). *fl.* white, erect; sepals five, elliptical, obtuse. April. *l.* all stalked, ternate; segments ovate-lanceolate, acute, toothed. *h.* 6in. France, 1597. This species

comes close to *A. nemorosa*.

A. vernalis (spring).* *fl.* whitish inside, violet and covered with silky down outside, erect, sub-sessile or on pedicels; sepals six, straight, elliptic-oblong. April. *l.* pinnate; segments cuneate-lanceolate, trifid; involucrum very villous. *h.* 6in. Europe, 1816. A curious rather than a showy species; it makes a pretty pot plant, but must not, under any consideration, be allowed to want water. It can be plunged in sand or ashes in the open, and just as the flowers commence to expand, transfer to a cool frame. It thrives best in a peat and loam compost, to which small pieces of charcoal may be added. SYN. *Pulsatilla vernalis*. See Fig. 102.

A. virginiana (Virginian).* *fl.* purplish green or pale purple, small; sepals five, elliptical, silky-pubescent on the outside; pedicels often rising in pairs from the involucel. May. *l.* ternate; segments trifid, acuminated, deeply toothed; those of the involucre and involucels stalked; peduncles three to four, much elongated, middle one naked, sometimes 1ft. high; lateral ones bearing two-leaved involucels. *h.* 2ft. North America, 1722. Border or woodlands, and damp places.

A. vitifolia (vine-leaved). *fl.* white,

villous on the outside; anthers copper colour; sepals eight, oval, oblong; pedicels one-flowered. July. *l.* large, cordate, five-lobed, beneath as well as the stems clothed with white wool; lobes broadly ovate, cut, and crenate; those of the involucrum stalked, woolly underneath, smooth above, bluntly cordate, five-lobed. *h.* 2ft. Upper Nepaul, 1829. This requires a warm sheltered position to stand the winter. Very near *A. japonica alba*, and probably the progenitor of it.

ANEMONOPSIS (from *anemone*, and *opsis*, resemblance; flowers like those of the Anemone). ORD. *Ranunculaceæ*. A handsome and remarkable hardy herbaceous perennial, not unlike *Anemone japonica*, but smaller. It thrives in any light soil. Propagated by seeds and divisions of the root-stock in spring.

A. macrophylla (large-leaved).* *fl.* in loose racemes; sepals about nine, concave, the outer three purple, internally pale lilac; petals twelve, in many rows, one-third the length of the sepals, linear-oblong. July. *l.* large, biternate, coarsely toothed, glabrous. *h.* 2ft. to 3ft. Japan, 1869.

ANEMOPÆGMA (from *anemos*, the wind, and *paigma*, sport). ORD. *Bignoniaceæ*. A handsome stove climbing shrub. For culture, *see* **Bignonia**.

A. racemosum (racemose).* *fl.*

delicate buff coloured, in axillary racemes, large. September. Brazil, 1879. This beautiful and vigorous climber is, as yet, very rare in cultivation.

ANETHUM (from *ano*, upwards, and *theo*, to run; in reference to its quick growth). ORD. *Umbelliferæ*. A genus of erect glabrous annuals. Flowers yellow; involucre and involucels wanting. Leaves decompound, with linear-setaceous lobes. This genus is of no ornamental value, its most important species being the garden Dill (*A. graveolens*), which *see* for culture.

ANGELICA (in reference to the supposed angelic medicinal virtues of some species). ORD. *Umbelliferæ*. Perennial or biennial herbs. Flowers white; umbels terminal; involucra wanting or of few leaves; involucels of many leaves. Leaves bipinnate. The common Angelica (*A. Archangelica*) is the only species that calls for mention. It is a native biennial, and was at one time in much request for confectionery, and as a herb of supposed great medicinal value. Seed should be sown in September or March in ordinary soil, and the young plants thinned out to about 18in. apart.

ANGELICA TREE. *See* **Aralia spinosa**.

ANGELONIA (from *angelon*, the local name of *A. salicariæfolia* in South America). SYN. *Schelveria*. ORD. *Scrophulariaceæ*. Very pretty stove herbaceous perennials. Flowers axillary, racemose; corolla irregular, bilabiate; lower lip saccate at the base, trifid; upper one smaller, bifid. Leaves opposite. Stem and branches quadrangular. A mixture of light turfy loam, peat, leaf soil, and sand, is a good compost.

Cuttings of young shoots in spring strike readily under a hand glass, or plunged in the propagating bed, giving plenty of air daily.

A. salicariæfolia (Willow-leaved).* *fl.* blue, hairy, axillary, solitary, pedicellate, disposed in terminal racemes. August. *l.* sessile, lanceolate, acute, serrated towards the apex, finely pubescent on both surfaces. *h.* 1½ft. to 3ft. South America, 1818.

ANGIOPTERIS (from *aggeion*, a vessel, and *pteris*, a wing). Including *Psilodochea*. ORD. *Filices*. A genus of gigantic greenhouse ferns. Capsules eight to fifteen, opening by a slit down the side, sessile, very close but not concrete, arranged in linear-oblong or boat-shaped sori near the edge of the frond. These ferns require a very liberal supply of water, and plenty of room to fully expand. The most suitable compost is a mixture of strong loam and peat, with some sharp sand. Thorough drainage must be afforded.

A. evecta (evectic). *cau.* erect, 2ft. to 6ft. high, 1½ft. to 2ft. thick, very fleshy. *sti.* swollen and articulated at the base, furnished with two large leathery persistent auricles. *fronds* 6ft. to 15ft. long, bi- or tripinnate; pinnæ 1ft. to 3ft. long, spreading, the lowest the largest; rachis swollen at the base; pinnules 4in. to 12in. long, ½in. to 1½in. broad, linear-oblong, sessile or shortly stalked, acuminate; edge entire or finely toothed. Tropics of Old World. This

is the only clearly defined species; the others usually known as distinct species are but varieties of it, and its culture should not be attempted if plenty of room cannot be afforded it.

ANGOPHORA (from *aggos*, a vessel, and *phero*, to bear; in reference to the shape of the fruit). ORD. *Myrtaceæ*. Australian evergreen greenhouse ornamental trees or shrubs. Flowers corymbose; calyx five or six-cleft. Leaves large, opposite. A mixture of leaf soil, peat, and sand suits them well. Ripened cuttings will root in sandy soil under a hand glass in a cool house, in a few weeks.

A. cordifolia (heart-leaved).* *fl.* yellowish, corymbose, large. May. *l.* sessile, ovate, cordate at the base, glabrous. *h.* 7ft. to 10ft. New Holland, 1789.

A. lanceolata (lanceolate-leaved).* *fl.* white, corymbose. May. *l.* petiolate, lanceolate, acuminate, glabrous. *h.* 4ft. to 6ft. New Holland, 1816.

ANGRÆCUM (deduced from *angurek*, a Malayan name for air plants). ORD. *Orchidaceæ*. TRIBE *Vandeæ*. These are among the most beautiful of epiphytal orchids. One characteristic, both remarkable and peculiar, is the long, hollow, tail-like spur depending from the base of the lip. The flowers are produced on spikes from the axils of the leaves. The leaves are evergreen, and arranged in two rows, the one opposite to the other, and, in many kinds, being curved, give the plant a very graceful appearance.

The fact of these plants producing their blooms during the winter—a period when flowers are generally scarce—considerably enhances their value. They usually continue six or eight weeks in perfection, or even more. The following table of night temperatures should be almost universally adhered to for all the species enumerated, except *A. falcatum*, which thrives best in a cool house. From November to February, 58deg. to 63deg.; March to May, September and October, 65deg.; June to August, 70deg. The day temperature should be 7deg. or 8deg. higher than that of the night. A compost of crocks, charcoal, and sphagnum is best. A layer of a few large crocks at the bottom of the pot or pan will be required; over these spread another layer of charcoal and smaller crocks, just enough to allow the roots to support the plant; so that the first pair of leaves will be, in large plants, about 4in. above the rim of the pot, or proportionately less in the case of small plants. When the plant is carefully adjusted in its proper position, and held there with one hand, the other hand should work in among the roots more crocks and charcoal, ceasing so to do when within 2in. of the rim; the remaining space must be occupied with fresh sphagnum, pressed firm (this is most essential) in a cone shape, which may be built up to within ½in. of the lower pair of leaves. Prior to potting, which ought to be done between February and April, water should be withheld for a short time; but give a good soaking immediately after the operation. In the process of repotting, clear the roots of the old moss, all rotten stems, and particles of decayed roots. If plants are potted as we have recommended, a thorough soaking once a week only, or if grown on blocks of wood, or in suspended baskets or pans, about twice weekly will be found

sufficient. Excessive fumigation, drought, whether atmospherical or at the roots, will cause the leaves to drop, and prevent any growth being made, in which case the plant ought to be lowered. If the stems have emitted but few roots, a ring of moss fastened round the stems, and kept constantly wet, will induce the plant to throw out additional roots, when the lowering may be proceeded with. To keep the plants free from insect pests, frequently sponge the foliage. Thrips generally prove very troublesome, and a moderate fumigation is needful, dislodging the insects that may be secreted low down in the centre of the plant, shortly before the operation, by dropping a little weak tobacco water or sulphur among them.

A. arcuatum (curved).* *fl.* white; racemes from the axils of the two-year-old leaves, two or three being produced from a single growth, about 6in. long, arching. *l.* about 4in. long, and ¾in. broad. Natal. SYNS. *Listrostachys arcuata*. *A. (Listrostachys) Sedeni* comes close to the above species, but is excessively rare in cultivation.

A. bilobum (two-lobed).* *fl.* white, with a tinge of rose, about 1½in. in diameter; spur 2in. long, produced from the side of the stem, just above the two-year-old leaves; racemes pendulous, 6in. or more long, bearing about a dozen flowers, which possess a slight fragrance. October to December. *l.* 4in. long by 2in. broad, two-lobed at the apex,

about eight on a plant. Stem erect, about 6in. high. Cape Coast, 1841. Should be grown in a basket.

A. caudatum (tailed). *fl.* greenish yellow, mixed with brown; labellum pure white; spur thick, pale green, about 9in. long, two-lobed at the lowest portion; racemes arching, 1ft. or more long, produced from the base of the two-year-old leaves. Autumn. *l.* pale green, drooping, about 10in. long by 1in. broad. *h.* 1½ft. Stem erect, or nearly so. Sierra Leone, 1834.

A. cephalotes (capitate).* *fl.* white. Tropical Africa, 1873.

A. Chailluanum (Chaillu's).* *fl.* white; sepals and petals narrow, acute; spur yellowish green, 4in. or more long; racemes pendulous, 8in. or 10in. long, about twelve medium sized flowers produced from the side of the stem, just above the axils of two-year-old leaves. *l.* 6in. long, 1½in. broad, slightly wavy, two-lobed at the apex, arranged in an imbricate manner. West Africa, 1866. A rare species.

A. Christyanum (Christy's). A curious species, with yellow or greenish-white flowers, having a much developed three-lobed lip. The plant has the aspect of *A. arcuatum*. 1880.

A. citratum (citron-like).* *fl.* creamy white, or pale yellow, nearly 1in. in diameter; spurs about 1½in. long; racemes three, on strong plants, produced from the axils of two-year-old leaves, arched, about 1ft. long, bearing sometimes twenty flowers. *l.* 4in. to 6in. long and 2in. broad, six or eight on a plant, occupying about 1½in. of stem. Madagascar, 1868. Habit compact; stem nearly erect.

A. distichum (two-rowed-leaved). *fl.* whitish, ¼in. across, on one-flowered pedicels, which are produced from the axils of the leaves. *l.* very short, closely imbricated, deep bright green. *h.* 6in. Sierra Leone, 1834. A very neat growing little species, and quite distinct.

A. eburneum (ivory-lipped).* *fl.* sepals and petals greenish white; lip uppermost, white, very large; racemes about 18in. long, from the axils of two-year-old leaves; footstalks erect, but gradually becoming pendulous from the commencement of the flowers. *l.* 20in. long by 2in. broad, light green, stiff. Madagascar, 1826. SYN. *Ærobion eburneum*. *A. virens* is an inferior variety, but *A. e. superbum* surpasses the type in beauty; it is, however, at present extremely rare.

A. Ellisii (Ellis's).* *fl.* pure white,

fragrant, about 2in. across, with narrow reflexed sepals and petals, the column standing very prominent; spur pale brownish, 6in. to 8in.; racemes frequently 2ft. long, on the side of the stem just above the axils of the two-year-old leaves, bearing about twenty blossoms. *l.* dark green, 9in. or 10in. long, and 2in. broad, divided at the apex into two unequal lobes. Madagascar, 1879.

A. falcatum (sickle-shaped).* *fl.* pure white, very fragrant; spur upcurved, 2in. long; racemes from the axils of the two-year-old leaves, short, bearing from two to five blooms. *l.* 2in. to 4in. long, very narrow and fleshy, dark green. 1815. An elegant little cool house species, and one of the smallest belonging to this genus. It should be grown in peat, in a basket or small pot suspended about 2ft. from the glass, but rather shaded.

A. Kotschyi (Kotschy's).* *fl.* yellowish white, perfume similar to the common white pink, 1in. to 1½in. across; spur reddish-tinted, 6in. or 7in. long, distinguished by the two spiral twistings; racemes from the axils of the lower leaves, 18in. long, bearing about twelve blossoms. *l.* 6in. long by 3in. broad, of which there are generally six or more on a good plant. Zanzibar,

1880. Should be grown in a basket, or on a cylindrical block of teak wood.

A. modestum (modest).* *fl.* pure white, 1in. to 1½in. across. *l.* distichous, 3in. to 6in. long, 1in. to 1½in. broad, elliptic or linear-oblong, acute, tip entire, pale bright green, leathery, nerveless. Stem short. Madagascar, about 1880.

A. pellucidum (transparent).* *fl.* white, of a delicate semi-transparent texture, and with a finely fringed labellum; racemes from the axils of the lowest leaves, hanging perpendicularly from the stems, about 1ft. long, bearing thirty to forty blossoms. *l.* 12in. long by 2in. or 3in. broad. Sierra Leone, 1842. Must be grown in a suspended basket.

A. pertusum (broken).* *fl.* pure white; spur comparatively short, with a well-marked yellow tinge; racemes from the axils of two-year-old leaves, horizontal, or slightly nodding, 6in. to 7in. long, with from forty to sixty densely packed, small blossoms. *l.* dark green, arching, 10in. long by 1in. broad. *h.* 1ft. Sierra Leone, 1836. Very distinct and attractive.

A. Scottianum (Scott's).* *fl.* pure white, very delicate in texture, the lip is uppermost, 1in. or more across;

spur narrow, yellowish, 3in. to 4in. long; peduncle slender, a little longer than the spur, usually but one-flowered. *l.* narrow, terete—thus differing from most of its congeners —tapering or awl-shaped, about 4in. long, ⅛in. to ¼in. in diameter, channelled in the upper surface and ridged below. Comoro Islands, 1878.

A. Sedeni (Seden's). A rare form of *A. arcuatum*.

A. sesquipedale (foot-and-a-half).* *fl.* beautiful ivory white, on stout, solitary, axillary peduncles, with sepals and petals spreading out like rays, from 6in. to 8in. across; the whip-like spur or nectary hangs down from the labellum, often from 10in. to 18in. long. November, December, and January, and lasts about three weeks in beauty. *l.* dark green, distichous, about 10in. long. *h.* 1ft. Madagascar, 1823. It is one of the grandest of winter flowering orchids.

A. virens (green). An inferior variety of *A. eburneum*.

ANGULAR. Having angles, or forming angles.

ANGULOA (commemorative of Angulo, a Spanish naturalist). ORD. *Orchidaceæ*. A small genus containing about six species. The flowers, which are large and beautiful, are borne singly on scapes from 12in. to 16in. high, several of which are produced from the ripened pseudo-bulbs of the preceding

year's growth. Pseudo-bulbs from 5in. to 8in. high, as thick as a man's wrist, bearing two to three erect, broad, lanceolate leaves, 2ft. to 4ft. long. Temperature, summer, day (maximum), 70deg.; night (minimum), 60deg. Winter, day (maximum), 60deg.; night (minimum), 45deg. These are bold growing cool-house plants, best grown in rough fibrous peat, with good drainage. They delight in an abundant supply of water both to the roots and foliage when growing, and require to be kept in a somewhat dark or heavily-shaded place. During the season of rest, and until young shoots commence growth, they should be kept rather dry. They are propagated by dividing the pseudo-bulbs, just before they commence to grow. The flowering season is summer.

A. Clowesii (Clowes's).* *fl.* fragrant; sepals and petals concave, clear golden yellow; lip pure white; whole conformation globular, or tulip-like. Columbia (at 5000ft. to 6000ft. elevation), 1842. This is the largest growing species, of which there are one or two rare varieties.

A. eburnea (ivory-flowered).* *fl.*, sepals and petals of the purest white; lip spotted with pink. New Grenada. In other respects similar to above, but is very rare.

A. Ruckeri (Rucker's).* *fl.*, sepals and petals yellow, with crimson spots; lip deep crimson. Columbia, 1845. Not so large a grower as either of the foregoing, but with same sized flowers.

A. R. sanguinea (bloody).* This variety has flowers of a deep blood red colour, but is rare.

A. superba (superb).* Synonymous with *Acineta Humboldtii*.

A. uniflora (one-flowered).* *fl.* sub-globose, pure white, sometimes freckled with brown, spotted profusely with pink inside. Columbia, 1844. One of the best in cultivation.

ANGURIA (one of the Greek names for the cucumber). ORD. *Cucurbitaceæ*. A stove genus of evergreen climbers allied to *Momordica*. Flowers monœcious; corolla joined to the calyx, ventricose, red, with a five-parted spreading border. Fruit somewhat tetragonal. Several species have been introduced from time to time, but they are rarely seen in our gardens. Some of them are handsome plants, and well worthy of cultivation.

ANHALONIUM. *See* **Mammillaria**.

ANIGOZANTHUS (from *anoigo*, to expand, and *anthos*, a flower; in reference to the branching expansion of the flower stalks). SYN. *Schwægrichenia*. ORD. *Hæmodoraceæ*. Greenhouse or half-hardy perennial herbs. Flowers large, racemose or corymbose; perianth tubular, elongated, woolly. Leaves linear ensiform. The species thrive in a turfy compost of peat and loam, three parts of the former to one of the latter; the whole intermixed with sand to make it porous. In the growing season they must be kept well watered, and somewhat dry during their period of rest in winter. They are very easily propagated by dividing the roots in spring.

A. coccineus (scarlet).* *fl.* scarlet; perianth swelling towards the summit, hairy, segments a little reflexed; disposed in dichotomously-forked panicles; pedicels rather long. June. *l.* lanceolate, deep green. Stem ciliated. *h.* 5ft. Swan River, 1837.



FIG. 103. INFLORESCENCE AND LEAF OF ANIGOZANTHUS FLAVIDUS.

A. flavidus (yellowish-green-flowered).* *fl.* yellowish green, panicled; scapes long. May. *l.* lanceolate, smooth, as is also the stem; down of branches deciduous. *h.* 3ft. New Holland, 1808. There is a scarlet and green-flowered variety of this species. See Fig. 103.

A. Manglesii (Mangle's). *fl.* green; stigma capitate, projecting beyond the tube, in a short terminal spiked raceme. May. Stem erect, clothed with short thick crimson persistent velvety down. *h.* 3ft. Swan River, 1833.

A. pulcherrimus (beautiful).* *fl.* yellow; panicles much branched, clothed with rufous bristles. May. *l.* equitant, linear falcate, covered with stellate tomentum. *h.* 3ft. Swan River, 1844.

A. tyrianthinus (purple).* *fl.* purple and white; panicle clothed with purple tomentum. May. *l.* linear, stiff, straight, glabrous. Stem tall, ternate, panicled, clothed with hoary tomentum below. *h.* 3ft. Swan River, 1844.

ANIL. *See* **Indigofera Anil**.

ANIME RESIN. *See* **Hymenæa Courbaril**.

ANIMATED OAT. *See* **Avena sterilis.**

ANISANTHUS. *See* **Antholyza.**

ANISE (*Pimpinella Anisum*). A hardy annual, occasionally used for garnishing or seasoning. Sow seed, in ordinary garden soil, on a warm sunny border, in May, where it is intended for the plants to remain.

ANISEED TREE. *See* **Illicium**.

ANISOCHILUS (from *anisos*, unequal, and *cheilos*, a lip; in reference to the inequality of both lips of calyx and corolla). ORD. *Labiatæ*. A very ornamental genus of stove perennials or biennials. Whorls of flowers densely imbricate into oblong cylindrical spikes; corolla with an exserted, defracted tube, inflated throat, and bilabiate limb. They thrive in any light rich soil. Cuttings will root in a sandy soil under a bell glass, in heat; seeds may be sown in February in heat.

> **A. carnosum** (fleshy). *fl.* lilac; whorls densely imbricate into oblong cylindrical pedunculate spikes. June to September. *l.* petiolate, ovate-roundish, obtuse, crenated, cordate at the base, thick, fleshy, tomentose on both surfaces. Stem erect. *h.* 2ft. East Indies, 1788.

ANISOMELES (from *anisos*, unequal, and *melos*, a member; in reference to the anthers of the longer stamens being halved). ORD. *Labiatæ*. Ornamental greenhouse or evergreen stove shrubs, herbaceous perennials, or annuals. Whorls sometimes densely many-flowered, at others few, and loose; corolla with upper lip erect, oblong, entire; lower lip larger, spreading, and lateral lobes ovate, obtuse. They are

of very easy culture in light rich soil; young cuttings strike freely in spring, in heat, under a bell glass. *A. furcata* requires little or no artificial heat, but the protection of a bell glass is beneficial. Seeds of *A. ovata* may be sown in spring, in heat, and, after due hardening off, the seedlings may be planted outside in May.

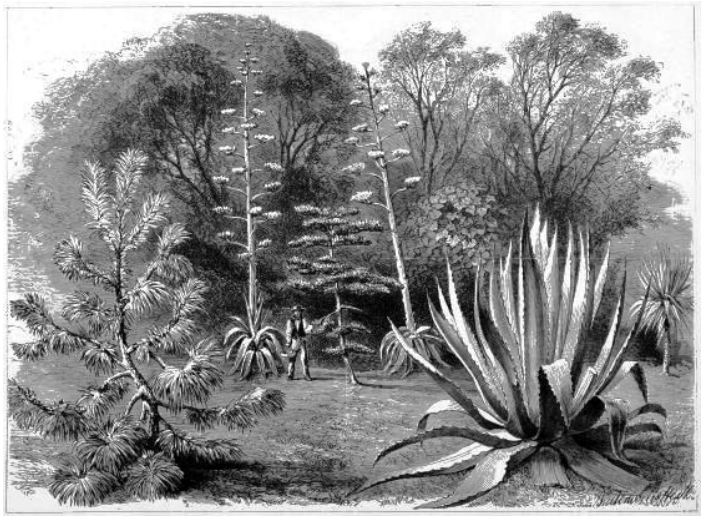
A. furcata (forked).* *fl.* small, elegantly variegated with white, red, and purple, in loose many-flowered racemose cymes. July. *l.* petiolate, ovate, acuminated, crenated, cordate at the base, hispid on both surfaces. *h.* 4ft. to 6ft. Nepaul, 1824.

A. malabarica (Malabar). *fl.* purplish; whorls distant, many-flowered, dense. July. *l.* oblong-lanceolate, 2in. to 4in. in length, obtuse, serrately crenated in the upper part, quite entire at the base. *h.* 2ft. to 5ft. Tropical Asia, in humid places, 1817. Shrub.

A. ovata (ovate-leaved).* *fl.* purple; lower lip of a deeper colour; whorls many-flowered, lower ones distant, upper ones interruptedly spicate. August. *l.* ovate, obtuse, broadly crenated. *h.* 2ft. to 3ft. Nepaul, 1823. An annual. Habitat similar to last.

ANISOMEROUS. Unequally-parted; unsymmetrical.

ANISOPETALUM. *See* **Bulbophyllum.**



THREAD-LEAVED PINE, AGAVES, AND YUCCA, IN A GUERNSEY GARDEN.

[See larger version]

ANNUALS. All plants which spring from the seed, flower, and die within the course of a year. A number of things, however, which are not strictly of annual duration, but which are sown every year in preference to housing the roots before they are killed by late autumn or winter frosts, are generally classed, for the sake of convenience, under the head of Annuals. Hardy Annuals are those which require no artificial aid to enable them to develop, but grow and flower freely in the open air. These are best sown in the spots where they are intended to remain during March and April, and care must subsequently be taken to keep the ground clear of weeds, and also to thin out the seedlings, allowing each sufficient room to develop and exhibit its true character. If allowed to remain too crowded, the plants, as a matter of course, suffer, and the size and number of the flowers and the general effect are considerably

decreased. Successional sowings of a good many of the showy species will be found to prolong their flowering season. In well-kept establishments, where Annuals are duly appreciated, several sowings are made in pots at intervals of a few weeks. As the previously-sown clumps begin to get shabby, they are removed, and replaced by others which have still to flower. By this means a continual sheet of blossom can be maintained for a long time. It is much better to trust to plants grown in pots in order to carry out the plan just sketched, as these receive no check when placed in their new quarters; whilst transplanted clumps frequently fail, and many species do not transplant at all readily from an open border. In order to secure, in early spring, a fine show of such plants as several of the *Silenes*, *Myosotis*, *Saponaria*, and a number of others, it is best to sow the seeds in an open, sheltered border, about the end of July or beginning of August, taking care to keep a small reserve stock in a cold frame, in case very severe weather kills the unprotected plants. Half-hardy Annuals are those for which our climate is not sufficiently warm, or, rather, our summer is not, as a rule, either hot enough or long enough, to allow them to grow, flower well, and ripen seeds, if sown in the open air. Many of these are amongst the showiest of garden plants, so it is worth while to give them the shelter of a warm frame during their earlier stages, and gradually harden them off, planting out at the end of May or beginning of June, when danger resulting from severe weather is passed. After germination, the seedlings should have plenty of light and air, or a weak, spindly growth, and, as a consequence, poor flowers, will result. The most satisfactory method of watering very tiny seeds is to place a piece of fine muslin over the seed-pot,

through which the water will be easily conveyed to the seeds, and thus prevent disturbance. Tender Annuals require the same treatment as the half-hardy ones, except that they need throughout their existence the protection of a glass structure. All, or nearly all, garden Annuals delight in full sunlight and plenty of air. In the open, these requirements, as a rule, obtain, but sometimes mistakes are made under glass by keeping the plants too close and over much shaded, as well as too great a distance from the glass.

ANNULAR. Having a ring-like form.

ANNULATE. With the appearance of rings.

ANŒCTOCHILUS (from *anoiktos*, open, and *cheilos*, a lip; in reference to the spreading apex of the lip). SYNS. *Anecochilus*, *Chrysobaphus*. ORD. *Orchideæ*. Stove terrestrial orchids, the radical leaves of which are the chief attraction, being amongst the most beautiful and delicate objects in the vegetable kingdom. The flowers, which should be pinched off so soon as they appear, are, as a rule, small and unattractive. Few of the species exceed 6in. in height, with leaves from 2in. to 6in. long, including the fleshy petioles. They require a good deal of attention. To one part of silver sand, thoroughly washed twice or three times, add two of sphagnum, which should also be well washed and picked over, when it should be chopped into minute particles, in order that it may freely amalgamate with the sand; mix a little loam and peat with the whole. In the pots, when well drained by first placing a large piece of potsherd over the bottom and nearly half filling up with pieces broken small and of uniform size, place a thin layer of crude sphagnum, afterwards filling firmly with the mixture above mentioned, and bringing it up more or less in

the form of a cone above the rim of the pot, into which the plants should be firmly fixed. Plants which have been propagated by division should be carefully transferred to 32-sized pots. About five separate pieces might be placed evenly over the surface. Make holes with a neat dibble, and into these drop the roots their entire length, pressing the soil firmly with the dibble. Fix them so that they may grow inwardly, and not out over the rim of the pots, pegging each creeping root needing such attention firmly down upon the surface of the soil afterwards; after a good soaking, they may be replaced in any warm, shady situation. For propagating, a strong plant is necessary; it may be cut into pieces just below the first joint, each piece having a root. The bottom piece should have two eyes—one to root from, and the other to push into a shoot. The "bottom," or plant which has been cut, should be replaced in its pot, and then put under a bell glass. It will soon throw up a young shoot; this ought to be left on until well rooted, when it may be separated and treated similarly to the portion first removed, still leaving the old part in the pot. These plants must be grown in glass cases, or under bell glasses, but they should always have a little air, for, as Mr. Williams says, when too much confined, they grow up spindly, and damp off in the stem; the latter, being fleshy, requires more substance and sturdiness. Air should be admitted through a space of about 1in. or 2in. The following ranges of temperature are advised: Winter, night, 55deg. to 60deg.; day, 65deg. to 70deg. during March, April, and May; night, 60deg. to 70deg.; and, afterwards, a few degrees higher, with a maximum day temperature of 80deg. Bottom heat should not be given, as it induces a weak, fast growth. Great care will be needed to prevent ravages

of insects. The most suitable month for repotting is March, just before growth commences, when the plants will need plenty of water up to October, excepting when it is desirous to utilise them as drawing-room ornaments, in which case they should be kept rather dry for a short time previous. *See also* **Dossinia**, **Goodyera**, **Hæmeria**, **Macodes**, **Physurus**, and **Zeuxine**.



Fig. 104. Ancœctochilus Friderici-Augusti.

A. argenteus pictus (silvery-painted). A synonym of *Physurus pictus*.

A. argyroneurus (silvery-veined).* *l.* light green, dark mottled; veins forming a beautiful silvery network. Java.

A. Boylei (Boyle's).* *l.* ovate, acuminate, 2in. long and broad, olive-green, netted and pencilled

with gold. India.

A. Bullenii (Bullen's).* *l.* 2½ in. long, ground colour bronzy green, with three broad distinct lines of coppery-red, or golden stripes running the entire length. Borneo, 1861.

A. concinnus (neat). *l.* ovate, acuminate, rounded at base, dark olive-green, netted and striped with shining coppery-red. Assam.

A. Dawsonianus (Dawson's).* *l.* ovate, of a dark velvety, rich olive-green, traversed by about seven longitudinal copper-coloured veins; the space on each side of the midrib being filled with fine reticulations of the same colour. Malay Archipelago, 1868. The proper name of this plant is *Hæmeria discolor Dawsoniana*.

A. Dayi (Day's). A synonym of *Dossinia marmorata Dayi*.

A. Dominii (Dominy's). *l.* dark olive-green, streaked down the centre with pale coppery-yellow, the main ribs marked by pale lines. Hybrid between *Goodyera discolor* and *A. Friderici Augusti*.

A. Eldorado (Eldorado). *l.* dark green, with small tracery of a lighter colour, deciduous. Central America.

A. Friderici-Augusti (Frederick Augustus').* *l.* 2½in. long, and 1½in.

broad, dark velvety green, with broad orange and green stripes down the centre, covered with a beautiful golden network. *h.* 5in. Very distinct. See Fig. 104. SYN. *A. xanthophyllus*.

A. Heriotii (Heriot's). *l.* 3½in. long, 2½in. broad, dark mahogany-colour, golden-reticulated, and with shadowy network. India.

A. hieroglyphicus (hieroglyphic-marked). *l.* small, dark green, with hieroglyphic-like, silvery-grey blotches. Assam.

A. intermedius (intermediate).* *l.* 2½in. long, and 1½in. broad, with a silky surface, dark olive, striped and veined with gold. *h.* 3in. Will succeed with a glass covering, in a stove, if shaded.

A. javanicus (Java). *fl.* pink, small, spicate; scape 9in. high. *l.* 2in. long, 1½in. broad, dark olive-green, with lighter blotches and faint golden reticulation, pinkish beneath. Java.

A. latimaculatus (broad-spotted).* *l.* dark green, with silvery markings. Borneo. A distinct and free-growing kind.

A. Lowii (Low's).* *l.* 4in. to 5in. long, 3in. broad, dark velvety-green, shading to orange-brown, lined from base to apex with deep golden veins, crossed by lines of the same hue. *h.*

6in. Borneo. The correct name of this plant is *Dossinia marmorata*.

A. L. virescens (greenish).* *l.* brighter green, with brighter markings over the whole surface.

A. Ordianus (Ordi's).* *l.* shape and habit of *A. Dawsonianus*, but the colour is a vivid green, and lined with golden veins. Java, 1869. The proper name of this plant is *Hæmeria discolor Ordiana*.

A. pictus (painted). A synonym of *Physurus pictus*.

A. querceticola (forest-dwelling). A synonym of *Physurus querceticolus*.

A. regalis (royal).* King Plant. *l.* 2in. long, 1½in. broad; surface a beautiful velvety green, veined in regular lines, and covered with a network of gold. *h.* 4in. Java, 1836. If examined with a lens in sunshine, the beauty of the network will be plainly seen. SYN. *A. setaceus* (of gardens). There are several varieties, the best of which are:

A. r. cordatus (heart-shaped). *l.* rounder, and gold markings broader. Very rare.

A. r. grandifolius (large-leaved).* *l.* light green, beautifully laced and banded with a network of gold. Also rare.

A. r. inornatus (unadorned). *l.* dark

rich velvety, with a few slight markings, destitute of the golden reticulation. Java.

A. Reinwardtii (Reinwardt's).* *l.* rich, deep velvety-bronze, intersected with bright golden lines. Java.

A. Roxburghii (Roxburgh's).* *l.* 2½in. long, 1½in. broad, dark velvety-green, striated with well-defined lines of silver. *h.* 3in. India. The true species is very rare; several are sold as such.

A. Ruckerii (Rucker's).* *l.* broadly ovate-bronzy-green, with six rows of distinct spots running from base to apex. Borneo, 1861.

A. setaceus (bristly). A garden synonym of *A. regalis*.

A. striatus (striated). A synonym of *Zeuxine regia*.

A. Turneri (Turner's).* *l.* large, rich bronze, freely golden-reticulated. One of the handsomest; a very free grower.

A. Veitchii (Veitch's). A synonym of *Macodes Petola*.

A. xanthophyllus (yellow-leaved). A synonym of *A. Friderici-Augusti*.

A. zebrinus (striped).* *l.* ovate-lanceolate, deep olive green, with copper-coloured veins. India, 1863.

Dwarf and elegant.

ANOMATHECA (from *anomos*, singular, and *theca*, a capsule, or seed-pod). ORD. *Irideæ*. Very pretty little bulbous perennials. Perianth hypocrateriform; tube triquetrous, constricted at the throat. The species are hardy when planted in warm sunny situations in the open border. Their dwarf stature, brilliance, profusion of flowers, and habit of blossoming continuously over a long period, render them very popular subjects amongst growers of hardy perennials. Although generally credited with being hardy, when cultivated out of doors they should be lifted and stored in frost-proof quarters before winter commences, until the following March. They are excellent as window garden plants, and also for pot culture. If grown in pots, they should be shaken out, and repotted in February or March. They multiply very rapidly, and may be divided in patches, not by single bulbs, once yearly. Light sandy loam, mixed with a little leaf mould, is the best compost. Anomathecas are sometimes increased by seed, which may be sown so soon as ripe, very thinly, in seed pans. Thin out the seedlings if growing very close together; the next season they may be put out four or five in a pot. When they become crowded, shift into a much larger pot, but do not disturb the ball. The young seedlings will probably produce flowers the second season.

A. cruenta (bloody).* *fl.* rich carmine-crimson; perianth segments elliptical, three lower ones broader than the others, with a dark blotch at the base; tube long, whitish; scapes secund, bearing about five or six flowers. Summer and autumn. *l.*

two-ranked, about ½in. broad, sword-shape, somewhat tapering. Bulb ovate, rather large. *h.* 6in. to 12in. Cape of Good Hope, 1830.

A. juncea (rushy). *fl.* very bright pink, with a dark spot at the base, produced in profusion. The leaves are narrower than those of the foregoing. Cape of Good Hope, 1791. A rare species.

ANONA (*Anona* is the name applied to these plants in St. Domingo). Custard Apple. ORD. *Anonaceæ*. Stove evergreen shrubs, with fragrant leaves. Petals six, in two rows. Carpels indefinite, joined into one fleshy, many-celled, edible, roundish fruit, with a muricated, scaly, or reticulated skin. Anonas thrive best in rich loamy soil, mixed with a little peat. Ripened cuttings, with leaves intact, will root if inserted in sand and placed under a hand glass, in a moist heat. When seeds are procurable, they should be sown in pots, and plunged into a hotbed.

A. Cherimolia (The Cherimoyer). *fl.* outer petals somewhat concave, linear-oblong, brown on the outside, each marked with a dark spot at the base; peduncles opposite the leaves, solitary. July. *fr.* somewhat globose and scaly, dark purple; esteemed by the Peruvians as one of their most delicate, and as being not inferior to any fruit in the world. *l.* ovate-lanceolate, not dotted; under surface silky tomentose, strong scented. *h.* 20ft. Peru, 1739.

A. glabra (smooth-fruited).* *fl.* outer petals ovate, obtuse, brown; calyx leathery, large; peduncles opposite the leaves, two-flowered. July. *fr.* greenish-yellow, conoid, blunt, smooth. *l.* ovate-lanceolate, smooth. *h.* 10ft. West Indies, 1774.

A. longifolia (long-leaved). *fl.* purplish; outer petals concave, thick, all acute, large, axillary, solitary, stalked. May. *fr.* ovate-globose, dotted, and reticulated, flesh-coloured. *l.* oblong, acuminated, mucronate, smooth. *h.* 20ft. Guiana, 1820.

A. muricata (muricated-fruited).* The Sour Sop. *fl.* outer petals cordate, concave, thick, acuminated, green on the outside, yellow inside, and spotted; peduncles solitary, one-flowered, sweet-scented. *fr.* muricated, with fleshy points, green. *l.* ovate-lanceolate, smooth, shining. *h.* 15ft. West Indies, 1656.

A. palustris (marsh). Alligator Apple; Cork-wood. *fl.* yellow; petals all acute. *fr.* rather areolate, large, heart-shaped, sweet-scented. *l.* ovate-oblong, leathery, quite smooth. *h.* 10ft. to 20ft. South America, 1788.

A. reticulata (netted). The Custard Apple, or Bullock's Heart. *fl.* outer petals oblong-lanceolate, acute, somewhat concave at the base,

brownish on the outside, whitish-yellow on the inside, marked with dark purple spots. *fr.* ovate-globose, reticulate, as large as a tennis ball, with yellowish soft flesh; it is much esteemed by some people. *l.* oblong-lanceolate, acute, smooth, somewhat dotted. *h.* 15ft. to 25ft. Brazil, 1690.

A. squamosa (scaly). Sweet Sop. *fl.*, outer petals linear-oblong, somewhat concave at the base, nearly closing, greenish-yellow. *fr.* egg-shaped, scaly. *l.* oblong, bluntish, smooth, full of pellucid dots, rather glaucous beneath. *h.* 20ft. South America, 1739.

ANONACEÆ. An order of trees or shrubs, mostly tropical, with axillary peduncles, lateral or opposite the leaves, and with alternate, simple, entire or hardly toothed leaves, without stipules. *Anona* is the typical genus.

ANONYMO. A synonym of **Saururus** (which *see*).

ANONYMOS BRACTEATA. *See* **Zornia tetraphylla**.

ANOPLANTHUS (in part). A synonym of **Phelipæa** (which *see*).

ANOPLOPHYTUM. *See* **Schlumbergeria** and **Tillandsia**.

ANOPTERUS (from *ano*, upwards, and *pteron*, a wing; in reference to the seeds, which are winged at the apex). ORD. *Saxifrageæ*. A very handsome greenhouse evergreen shrub, having a free branching habit, large dark shining green leaves, and long

panicles of salver-shaped flowers. It would probably prove quite hardy in the south and west of England, and parts of Scotland, provided it had a slight winter protection. It grows well in sandy loam and peat. When grown in pots, it requires plenty of room and water. Half-ripened cuttings root freely under a bell glass in a cool house or frame in summer.

A. glandulosa (glandular).* *fl.* white, rose tinted, large; racemes erect, simple, terminal. April, May. *l.* alternate, rarely nearly opposite, ovate-oblong, attenuated at both ends, nearly sessile, leathery, toothed. *h.* 3ft. Van Diemen's Land, 1823.

ANSELLIA (named after Mr. Ansell, the botanical collector who accompanied the ill-fated Niger Expedition). ORD. *Orchidaceæ*. Strong growing, free flowering stove epiphytal orchids. Best grown in large pots, as they produce a quantity of roots. They require a compost of turfy peat, with moderate drainage. An ample supply of water during the growing season is needed; but care must be taken not to let any remain in the heart of the plants, as they are very likely to rot. During the season of rest, little or no water, but a damp atmosphere, are the chief requirements. Propagated by divisions of the bulbs just after flowering.

A. africana (African).* *fl.*, sepals and petals nearly 2in. long, greenish yellow, spotted with brownish red; lip small, yellow; spikes large, drooping, branched, each sometimes bearing nearly a hundred blooms.

Stems 3ft. to 4ft. high, with light evergreen foliage. Fernando Po, 1844. Lasts two months in perfection.

A. a. gigantea (gigantic).* *fl.* on upright spikes from the top of the pseudo-bulbs, but smaller, of a light yellow tint, with very few narrow, transverse, brown bars, and a deep yellow lip, without warts of any kind on its middle lobe, and with more or less crenulated keels. Natal, 1847. The perfume is very peculiar. Very rare.

A. a. lutea (yellow). Not so strong a grower; producing clusters of light yellow flowers from the top of the pseudo-bulbs. Natal.

A. a. nilotica (Nile district).* As a garden plant this is much superior to the type. The habit is dwarfer, the colours of the flowers brighter and more distinctly defined. The sepals and petals, too, are more spreading. Eastern Africa.

ANSERINA. *See* **Potentilla anserina**.

ANTENNÆ. Two movable, articulated organs attached to the heads of insects and crustacea, commonly called "horns" or "feelers." They are variable in form and length. Antennæ seem to serve for touch, and, perhaps, for smell and hearing.



FIG. 105. ANTENNARIA MARGARITACEA, showing Habit and Inflorescence.

ANTENNARIA (from *antennæ*; in reference to the similarity which exists between the seed down of the plant and the antennæ, or feelers, of an insect). ORD. *Compositæ*. Hardy herbaceous perennials, distinguished by the dry, coloured, chaffy scales encircling each head of flowers, of which the stamens and pistils are on different plants. These are charming little alpine plants, admirably adapted for rockwork, pots, edgings, or borders, in any light soil. Propagated by divisions of the roots in spring, and seeds; the latter should be sown in spring in a cold frame. Grown chiefly for their leaves.

A. dioica (diœcious).* *fl.-heads* pink, in crowded corymbs, 3in. to 4in. high. June. *l.* radical ones spathulate, woolly chiefly beneath; upper ones lanceolate. Stems simple;

shoots procumbent. Britain. The two or three varieties of this pretty species exceed the type in beauty. SYN. *Gnaphalium dioicum*.

A. d. hyperborea (northern). *l.* woolly on both surfaces.

A. d. minima (smallest).* A very small growing variety.

A. margaritacea (pearly).* *fl.-heads* white, corymbose. August. *l.* linear-lanceolate, acute, alternate, cottony, especially beneath. Stems branched above. *h.* 2ft. Naturalised in England and on the Continent. Said to have been introduced from America about the sixteenth century. The prettier but much rarer *A. triplinervis*, from Nepaul, comes close to this species. See Fig. 105.

A. tomentosa (downy).* *fl.-heads* corymbose. Summer. One of the dwarfest and best of silvery-leaved plants, either as an edging for small beds or for covering the higher portions of rockwork; it is much used in carpet bedding. It scarcely grows more than 1in. high, and forms a dense carpet in a short space of time. It should be grown separate from other plants. It is frequently known under the name of *A. candida*.

ANTERIOR. Placed in front, or outwards.

ANTHEMIS (from *anthemon*, a flower; referring to their general floriferous character). Camomile. ORD. *Compositæ*. Receptacle convex, chaffy. Involucre hemispherical or nearly flat; scales imbricated, membranaceous at the margin. Pappus none; ray florets ligulate; disk tubular. This is a large genus, principally of medicinal value, and contains very few species worth the cultivator's trouble. Of easy culture in any ordinary soil. Propagated by divisions.

A. Aizoon (Aizoon).* *fl.-heads* resembling a white Daisy; florets of the ray fourteen to eighteen, trifid, twice as long as the breadth of the disk. Summer. *l.* lanceolate, or broadly so, acutely and deeply serrated, narrowed towards the base, covered with white down; lower ones crowded; stem-leaves rather acute, gradually lessening in size. *h.* 2in. to 4in. Northern Greece. Free grower, dwarf, and compact.

A. Biebersteinii (Bieberstein's).* *fl.-heads* yellow. Summer. *l.* pinnately divided into linear three-lobed segments, which are covered with white silky pubescence. *h.* 1ft. to 2ft. Caucasus.

A. Chamomilla fl. pl. *See* **Matricaria**.

A. nobilis (noble). Common Chamomile. *fl.-heads* solitary; disk yellow; ray white; scales of the receptacle membranaceous, scarcely longer than the disk. *l.* bipinnate,

segments linear-subulate, a little downy. Stem procumbent, and much branched. England. A very strong smelling plant, of great medicinal value. For culture, *see* **Chamomile**.

A. tinctoria (dyer's). *fl.* bright yellow, in large heads. July and August. *l.* bipinnatifid, serrate, downy beneath. Stem angular. *h.* 1½ft. England. A very pretty plant.

ANTHER. The male part of a flower containing the pollen.

ANTHERICUM (from *anthos*, a flower and *kerkos*, a hedge; in reference to the tall flower stems). SYN. *Phalangium*. ORD. *Liliaceæ*. A large genus, belonging to the capsular group of the order, and inhabiting, for the most part, the Cape of Good Hope. Flowers white, racemose or panicled, scapose; perianth segments either spreading from near the base or campanulately united; stamens short, with naked or bearded filaments. Leaves radical, filiform or linear. The hardy varieties are now extensively grown, and are among the most ornamental of border plants. They thrive best in rich light soil, and are excellent subjects for pot culture; for which purpose use a compost of fibrous loam, leaf mould, or well-decayed manure, and coarse sand. The pots should be about 12in. across, well drained, and the plants potted just previous to, or so soon as, growth commences. During activity, plenty of water is needed, until the plants have finished flowering, when the quantity may be lessened; but never allow them to get dry. Propagated by division of the roots or seeds, sowing the latter, as early as possible after they are ripe, in a cold frame.

A. graminifolium (grass-leaved). A garden name of *A. ramosum*.

A. Hookeri (Hooker's). *See* **Chrysobactron Hookeri**.

A. Liliago (Liliago).* St. Bernard's Lily. *fl.* pure white, 1in. to 1½in. across; perianth segments spreading; style curved. May to August. *l.* tufted, narrow, channelled, 12in. to 18in. high. South Europe, 1596. A very free flowering species, of which there is a *major* variety in gardens. SYNS. *Phalangium* and *Watsonia Liliago*.

A. Liliastrum (Liliaster).* St. Bruno's Lily. *fl.* much larger than the last, 2in. long, and as much across, fragrant, of a transparent whiteness, with a delicate green spot on the point of each segment, campanulate, arranged in loose spikes. Early summer. *l.* long, narrow, six or eight to each plant, about 1ft. to 2ft. long, *h.* 1ft. to 2ft. South Europe, 1629. SYNS. *Czackia Liliastrum* and *Paradisia Liliastrum* (this is the correct name). See Fig. 106.



Fig. 106. Anthericum Liliastrum, showing Habit and Flower.

A. L. major (greater). *fl.* about 1in. larger than the type. *h.* about 6ft. A very desirable border plant.

A. ramosum (branched).* *fl.* white, rather smaller than those of *A. Liliago*; perianth segments narrow and spreading; style straight; flower stems much branched. June. *l.* long, narrow, channelled, grass-like. *h.* 2ft. South Europe, 1570. A rapid grower. Syn. *A. graminifolium* (of gardens).

A. serotinum (late-flowering). *See* **Lloydia**.

A. variegatum (variegated). *l.* keeled, grass-like, striped and margined with white. South Africa, 1875. Half hardy. The proper name of this plant is *Chlorophytum elatum variegatum*. SYNS. *A. Williamsii* and *Phalangium argenteo-lineare*.

A. Williamsii (Williams'). Synonymous with *A. variegatum*.

ANTHERIDIA. The reproductive organs in cryptogamic plants, analogous to anthers in flowering plants.

ANTHERIFEROUS. Bearing anthers.

ANTHESIS. The opening period of flowers.

ANTHOCARPOUS. Bearing a fruit resulting from many flowers.

ANTHOCERCIS (from *anthos*, a flower, and *kerkis*, a ray; in reference to the radiated corolla). ORD. *Solanaceæ*. Handsome greenhouse evergreen shrubs, with alternate leaves, attenuated into the petioles or base, thick, sometimes glandularly dotted. Flowers axillary, generally solitary; corolla campanulate. Cuttings strike freely in sand under a bell glass, with a mild bottom heat. So soon as they have well rooted, pot off into very small pots in two-thirds good loam and one of peat. After having made a little headway, the leading shoots should be pinched off, to induce a lateral growth; they may be transferred to pots a size larger when the roots have filled the first pot. Continue growing throughout the summer in frames or in the greenhouse, near the glass, allowing plenty of air. Vigorous growth should be checked; thus encouraging bushy plants.

A. albicans (whitish-leaved).* *fl.* white, streaked with bluish-purple inside the tube, fragrant; petals longer than the tube. April. *l.* oblong, obtuse, densely tomentose on both surfaces, as well as the branches. *h.* 1½ft. to 2ft. New South Wales, 1824.

A. floribunda (many-flowered). *fl.* white. *h.* 3ft. New South Wales.

A. ilicifolia (Holly-leaved). *fl.* yellowish green. June. *h.* 6ft. Swan River, 1843.

A. littorea (shore). *fl.* white. June. *h.* 3ft. New Holland, 1803.

A. viscosa (clammy).* *fl.* large, white. May. *l.* obovate, glandularly dotted with scabrous margins; young leaves and branches clothed with fine down. *h.* 4ft. to 6ft. New Holland, 1822.

ANTHOLOMA (from *anthos*, a flower, and *loma*, a fringe; in allusion to the fringed or crenulated limb of the corolla). ORD. *Tiliaceæ*. A very fine greenhouse evergreen tree; it thrives best in a light loamy soil, mixed with a little peat. Cuttings of ripened wood will strike root in sand, under a hand glass.

A. montana (mountain).* *fl.* white; corolla ovately cylindrical, with a crenate, rather toothed margin; racemes axillary, somewhat umbellate, reflexed. May. *l.* elliptical-oblong, leathery, stalked,

scattered at the top of the branchlets. *h.* 20ft. New Caledonia, 1810.

ANTHOLYZA (from *anthos*, a flower, and *lyssa*, rage; in reference to the opening of the flowers, which resemble the mouth of an enraged animal). SYN. *Petamenes*. Including *Anisanthus*. ORD. *Irideæ*. A very pretty genus of bulbous plants from the Cape of Good Hope, having narrow, erect, Iris-like leaves, and flower-spikes that over-top the foliage, bearing numerous bright-coloured flowers. Perianth tubular, six-cleft, unequal, the upper segments longest; stamens three. The species may be grown in a greenhouse, or planted out in a frame. They also thrive excellently out of doors, and should be planted 8in. or 9in. deep for fear of frost, or have a winter protection of several inches of cocoa-nut fibre refuse or litter. The safer plan is to raise the roots, winter them in some dry part of the greenhouse; but, previous to storing, divide the clumps, clean them, and re-plant or pot in February, or early in March. A mixture of equal parts peat, sandy loam, and leaf soil is most suitable for their culture. Just previous to flowering, if in pots, frequent doses of weak manure water will be found beneficial. They may be propagated by offsets, which are produced in abundance, at almost any time. Seeds are sometimes procured, which should be sown so soon as ripe, in light soil, in a cool house, where they will germinate the following spring, and will be fit to plant out in the summer of the same year. With the exception of *A. Cunonia*, they all much resemble each other. Only four or five species of this genus are worth cultivating.

A. æthiopica (Æthiopian).* *fl.*

scarlet and green. June. *h.* 3ft. 1759. SYNS. *A. floribunda*, *A. prælta*.

A. æ. ringens (gaping). *fl.* red and yellow, rather smaller than those of the type. SYN. *A. vittigera*.

A. bicolor (two-coloured). Synonymous with *A. Cunonia*.

A. caffra (Caffrarian).* *fl.* rich scarlet; spike distichous, many-flowered. June. *l.* long, linear, or linear-ensiform. *h.* 2ft. 1828. A very showy and pretty species, but rarely seen in our gardens. SYN. *Anisanthus splendens*.

A. Cunonia (Cunon's).* *fl.* scarlet and black, a combination of colours uncommon among bulbous plants; spikes secund. June. *h.* 2ft. 1756. SYN. *Anisanthus Cunonia*.

A. floribunda (much-flowered). A synonym of *A. æthiopica*.

A. prælta (very tall). Synonymous with *A. æthiopica*.

A. vittigera (glandular). Synonymous with *A. æ. ringens*.

ANTHOMYIA. *See* **Beet Fly**, **Cabbage Fly**, and **Onion Fly**.

ANTHONOMUS. *See* **Grubs**.

ANTHOSPERMUM (from *anthos*, a flower, and *sperma*, a seed). Amber Tree. ORD. *Rubiaceæ*. An ornamental greenhouse evergreen shrub from the Cape of Good Hope. It thrives in peat, loam, and

sand, with a summer temperature of 50deg. to 65deg., and winter, 40deg. to 45deg. Increased by cuttings, in sand, under a bell glass. There are above twenty other species belonging to this genus.

> **A. æthiopicum** (Æthiopian).* *fl.* diœcious, male brownish, and the female ones green, disposed in verticillate spikes. June. *l.* linear-lanceolate, three in a whorl, shining above, glabrous beneath, about ¼in. long. Stem much branched, downy above. *h.* 2ft. to 3ft. 1692.

ANTHOTAXIS. The arrangement of flowers on an inflorescence.

ANTHOXANTHUM (from *anthos*, a flower, and *xanthus*, yellow). Spring Grass. Calyx of two valves, glumaceous, one-flowered; corolla double, each of two valves: the exterior awned; the interior small, awnless; stamens two, not three, as is usually the case with grasses. ORD. *Gramineæ*. A pretty native hardy perennial, of easy culture in common garden soil.



FIG. 107. ANTHOXANTHUM ODORATUM.

A. odoratum (sweet). *fl.* panicle spiked, oblong, dense, becoming dullish yellow. *l.* short, pale green. *h.* 1ft. The pleasant smell of new-made Hay is chiefly owing to this plant, which in drying emits an odour similar to that of *Asperula odorata*. See Fig. 107.

ANTHURIUM (from *anthos*, a flower, and *oura*, a tail; referring to the inflorescence). ORD. *Aroideæ*.

Flowers densely disposed on a cylindrical spadix, at the base of which is a large bract-like spathe, that ultimately bends backwards. Leaves of various shapes. This very large genus of handsome stove and greenhouse plants is remarkable both for the peculiar inflorescence and often noble leaves, and is distinguished in structure from all the European members of the order in the flowers being hermaphrodite. Fibry peat, loam, sphagnum, broken crocks, or charcoal, and silver sand, form the most suitable compost. In preparing the peat, it should be broken up into small lumps, and then have most of the earthy matter knocked out of it by giving it a few raps with a stick, or by shaking it about in a sieve. To this, after so treated, add about one-fourth its bulk of sphagnum, and about half its bulk of fibrous loam, and just a sprinkling of fresh broken crocks, or small pieces of charcoal and sharp silver sand. In placing them in the pots—which must be well drained—carefully spread out the roots and work the mixture among them, keeping the plant well up, so that when finished it stands clear above the rim of the pot at least 2in. or 3in., and forms a kind of mound or hillock. They must then be kept freely syringed or watered, and placed in a moist atmosphere, where they can enjoy a temperature ranging between 60deg. and 70deg., or a few degrees lower for the less tender species. Raising plants from seed requires patience. About a year elapses from the time the flowers are fertilised—which should be done artificially—before the seed ripens, and often another to get up plants. Sow as soon as ripe in shallow, well-drained pans or pots, filled with the potting mixture, and cover slightly, and place in a close, moist propagating case, where a temperature of from 75deg. to 85deg. is maintained, or they may

be covered with bell glasses. The principal thing is to keep the air about them constantly humid, and the material in which they are sown in a uniformly moist condition; if this is done, the young seedlings will make their appearance in due course. When these are of sufficient size to handle, they should be pricked off in the same sort of compost, and be kept close and moist till they get a start, after which gradually inure them to more air. January is the best month of the year wherein to propagate these plants by divisions. This is done by carefully turning them out of their pots and shaking out what soil they have amongst their roots, which must be tenderly dealt with, so as not to bruise or injure them. This done, they may then be pulled apart, and as many plants made as there are separate crowns, or the mass may be simply halved or quartered, according to the stock required. Treat now as recommended above for potting. They are all moisture-loving plants, and must have a copious supply of water at all times, although, of course, much less during the winter than spring and summer months. There is no season of the year when they can be handled for any purpose with less risk or check than January. A moderate moist stove heat is advisable for them generally. The species enumerated are selected from nearly 150, and will be found to be a very representative collection. *See also* **Spathiphyllum**.

A. acaule (stemless).* *fl.*, spadix blue in a young state, borne on long footstalks, sweetly scented. Spring. *l.* broad, oblong, acuminate, 1ft. to 3ft. in length, erect, arranged in a rosulate manner, dark shining green on the upper surface, somewhat

paler beneath. West Indies, 1853. A noble species.



Fig. 108. Anthurium Andreanum.

A. Andreanum (André's).* *fl.*, spadix about 3in. long, yellowish, with a broad central band of white; spathe open, cordate-ovate, orange red, leathery, 3in. to 4in. across, and 6in. to 9in. long; surface irregularly corrugated. *l.* ovate-lanceolate, deeply cordate, green. Columbia, 1876. A very beautiful species. See Fig. 108.

A. Bakeri (Baker's).* *fl.*, spathe

small, green, reflexed; the spadix, wherein lies the plant's principal beauty, exhibits a lovely combination of pink and bright scarlet; the fleshy rachis being pink, and the pea-sized fruits bright scarlet. July. *l.* linear, leathery, green, with stout midribs. Costa Rica, 1872.

A. cordifolium (cordate-leaved).* *l.* 3ft. long and 20in. broad, heart-shaped, deep shining green on the upper surface, and paler below. *h.* 4ft. New Grenada. One of the best, and may be grown in a greenhouse or even in a sheltered spot of the sub-tropical garden during July and August. *A. Browni*, although quite distinct, comes close to this species.

A. coriaceum (leathery).* *l.* very thick, leathery, ovate, about 2ft. long; petioles stout, about the same length. Brazil. An admirable sub-tropical species.



Fig. 109. Anthurium crystallinum.

A. crystallinum (crystalline).* *l.* large, ovate-cordate, acuminate, bright rich velvety green, principal veins elegantly banded with pure crystal white; when young, the leaves are violet colour; petioles terete. *h.* 2ft. Columbia. See Fig. 109.

A. cuspidatum (cuspidate). *fl.*, spathe crimson, reflexed, shorter than the purplish spadix. *l.* ovate-

oblong, acuminate, 10in. to 20in. long, green. *h.* 2ft. to 3ft. Columbia.

A. ferrierense (Ferrières).* *fl.*, spathe cordate, about 5in. long, and 4in. wide, bright red; spadix erect, about 4in. long, ivory white. *l.* large, cordate. A handsome hybrid between *A. ornatum* and *A. Andreanum*.

A. fissum (cut-leaved). *fl.*, spathe green, erect, narrowly lanceolate-acuminate. *l.* cut into four to seven elliptic oblong-acuminate segments, green; petioles longish, terete. *h.* 2ft. Columbia, 1868.

A. Harrisii pulchrum (beautiful).* *fl.*, spathe linear-lanceolate, creamy white, deflexed, and pinkish at top; spadix erect, deep crimson; scape about 1ft. long, pale green. *l.* lanceolate, rounded at the base, pale green, with confluent white markings intermixed with dark green. Stem short. Brazil, 1882. A beautiful variegated plant. The typical *A. Harrisii* is extremely rare.

A. Hookeri (Hooker's). *fl.*, spathe green; spadix green or violet. *l.* obovate-spathulate, narrowed to a wedge-shaped base, and shortly stalked, shining, about 30in. long and 8in. broad. *h.* 3ft. Tropical America, 1840. Syns. *A. Huegelii*, *Pothos acaulis*.

A. Huegelii (Huegel's). A synonym of *A. Hookeri*.

A. insigne (showy).* *l.* three-lobed, middle lobe lanceolate, the two lateral ones are nearly ovate, and have from three to five longitudinal ribs; when young, the leaves have a bronzy tinge; petioles terete, slightly sheathing at the base. Columbia, 1881. A very handsome species.

A. Kalbreyeri (Kalbreyer's).* *l.* palmate, about 2½ft. across; leaflets nine, obovate-oblong, acuminate, sinuate, thick, glabrous, rich deep green, those furthest from the stem are much larger than those next the axis; petiole cylindrical, thickened at the top. New Grenada, 1881. A very handsome climbing species.

A. lanceolatum (lanceolate). *fl.*, spathe lanceolate, deflexed, yellowish green; spadix dark brown. *l.* lanceolate, stalked, green, 1ft. long, narrowed to the base. There appears to be much confusion as regards this and many varieties of *A. Harrisii*; and the specific designation is indiscriminately applied to lanceolate-leaved forms generally. The true species was introduced to Kew from the West Indies. SYN. *A. Wildenowii*.

A. leuconeurum (white-nerved). Green. Mexico, 1862.

A. Lindenianum (Linden's).* *fl.* fragrant, spathe very pretty, white, not reflexed, but the pointed apex slightly arches over and shelters the white or purplish spadix. October. *l.* deeply cordate, of a roundish outline; petioles long. *h.* 3ft. Columbia, 1866. SYN. *A. Lindigi* (of gardens).

A. Lindigi (Lindig's). A garden synonym of *A. Lindenianum*.

A. macrolobum (large-lobed).* *l.* large, deflexed, cordate, acuminate, with an open sinus at the base, and about three acute marginal lobes, dark green, marked with about five pale green ribs; petioles green, terete. Stem erect, short. A fine hybrid.

A. nymphæifolium (Nymphæa-leaved). *fl.*, spathe white; spadix purplish. Venezuela, 1854.

A. ornatum (adorned).* *fl.*, spathe linear-oblong, white, 5in. to 6in. long, on terete green scapes, enclosing cylindrical purplish spadices of about the same length as the spathes, and studded with white points arranged spirally. Spring. *l.* ovate or oblong-cordate, on slender terete petioles. *h.* 2½ft. Venezuela, 1869.

A. regale (royal).* *l.* large, cordate-acuminate, 1ft. to 3ft. long, dull

metallic green, with white veins; young leaves tinged with rose, on long smooth footstalks. East Peru, 1866. An excellent species for conservatory or window decoration during summer.



Fig. 110. Anthurium Scherzerianum.

A. Scherzerianum (Scherzer's).* *fl.* on bright red peduncles, which spring from among the base of the leafstalks; spathe ovate-oblong, 3in. long and nearly 2in. broad, intense and brilliant scarlet; spadix orange

coloured. *l.* oblong-lanceolate, 12in. to 18in. long, and 2in. or more broad, deep rich green, leathery. Costa Rica. A very compact dwarf-growing evergreen about 1ft. high. It continues in beauty about four months. See Fig. 110.

A. S. album (white). A synonym of *A. Scherzerianum Williamsii.*



Fig. 111. Anthurium Scherzerianum maximum.

A. S. maximum (greater).* A very fine variety, with "gigantic flower

spathes, which measure about 9in. in length by 4in. in breadth, and are of the most brilliant scarlet colour." See Fig. 111.

A. S. pygmæum (small).* Altogether smaller than the type, with narrow leaves, which are from 4in. to 6in. long, and about ½in. broad. It is one of the best varieties, and produces flowers very freely. 1880.

A. S. Rothschildianum (Rothschild's). *fl.*, spathe creamy white, spotted with crimson; spadix yellow. 1880. Exactly intermediate between its parent plants—the typical species and the following variety.

A. S. Wardii (Ward's).* *fl.*, spathe 6in. long, 4in. broad, very brilliant. *l.* broader and more robust than those of the typical species. A splendid variety.

A. S. Williamsii (Williams's).* *fl.*, spathe white; spadix yellowish. May. *l.* lanceolate-acuminate. Costa Rica, 1874. SYN. *A. Scherzerianum album*.

A. signatum (well-marked). *l.* apparently three-lobed; front lobe about 1ft. long and 4in. wide; the two side ones 4in. long, and about 6in. from the midrib to the extremity, dark green; petioles about 1ft. long. Venezuela, 1858.

A. spathiphyllum (Spathiphyllum).

fl., spathe about 1¾in. long, and nearly as much broad, erect, boat-shaped, broadly ovate, white; spadix nearly 1in. long, very obtuse, pale yellow. *l.* narrow lanceolate, 16in. to 24in. long, and about 2in. wide, bright green above, pale greyish green beneath; midrib prominent; petiole 3in. to 6in. long, trigonous. *h.* 1½ft. Tropical America, 1875.

A. splendidum (splendid).* *l.* cordate, with an open sinus, the lobes meeting behind; "the course of the nerves is marked by a broadish band of deep lustrous velvety green, the intervening spaces of about equal width being in striking contrast, of a pale yellowish green; the leaf surface is scabrous, and the portions between the ribs strongly bullate, as if raised in papillose blisters; the veins on the under surface are angular, with tooth-like projections at intervals, while the whole under surface is punctuated with small pallid dots" (W. Bull). Stem short, thick. South America, 1882. A very beautiful species, quite distinct from any others of the genus. See Fig. 112.

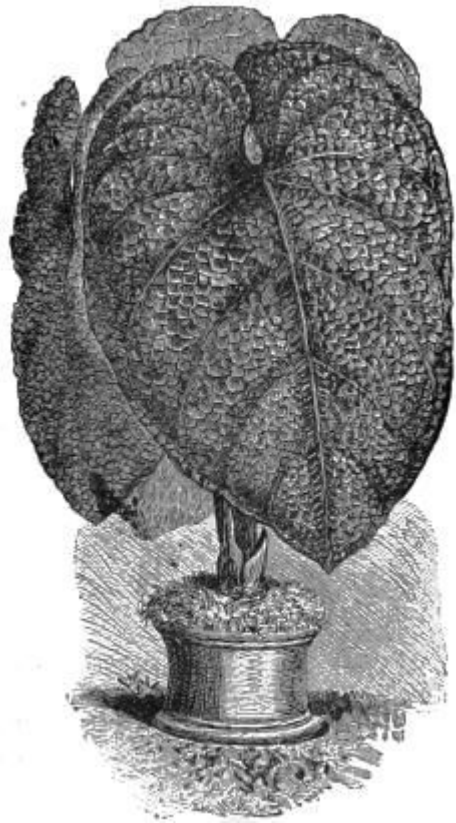


Fig. 112. Anthurium splendidum.

A. subsignatum (nearly allied to Signatum).* *l.* thick and fleshy, hastate, with blunt points, 12in. to 18in. long, and as much in breadth at the widest part; dark shining green above, paler beneath; petioles about 1ft. long. *h.* 1½ft. Costa Rica, 1861. An excellent species.

A. tetragonum (four-angled). *l.* erect, commences very narrow, 1ft. wide at its broadest part; margins

undulate, deep shining green on the upper surface, paler below; petioles short, quadrangular. Tropical America, 1860. An excellent sub-tropical species.

A. triumphans (superior). *fl.*, spathe narrow, green; spadix stout, greenish-white; peduncle quadrangular. *l.* alternate, elongately cordate, bright green; ribs prominent, and of a paler hue. Stem erect. Brazil, 1882. A handsome plant.

A. Veitchii (Veitch's).* *l.* ovate-oblong, greatly elongated, 2ft. to 3ft. long, with a breadth of less than one-third of these dimensions, leathery, deep green, with a glossy metallic surface when first expanded that becomes paler with age; the principal nerves are arched and deeply sunk, imparting a curiously waved appearance to the surface. *h.* 2½ft. Columbia, 1877. Rare but very handsome.

A. Waluiewi (Walujew's).* *l.* broadly cordate, 12in. to 14in. long, 8in. to 10in. broad, olive metallic green, when young, bright reddish crimson; petioles four to five-angled. *h.* 2ft. Venezuela, 1880. A very distinct and noble species.

A. Waroqueanum (Waroque's).* *l.* elongated, from 24in. to sometimes 36in. long, and 8in. to 11in. broad,

very rich deep green, of a velvety lustre; midribs and veins light, forming a very pleasing contrast. Columbia, 1878. A very free grower.

A. Wildenowii (Wildenow's). A synonym of *A. lanceolatum*.

It may be here remarked that by far the majority of species enumerated in the *Supplement* of Johnson's Dictionary are chiefly of botanical interest, and will, therefore, never become extensively cultivated.

ANTHYLLIS (from *anthos*, a flower, and *ioulos*, down; flowers usually downy). Kidney Vetch. ORD. *Leguminosæ*. Herbaceous or sub-shrubby plants, of variable habit. Flowers in spikes or heads; calyx tubular, five toothed, permanent after flowering, more or less inflated. Petals nearly equal. Although not extensively grown, all the species are very beautiful when in flower, the hardy sorts being admirably adapted for rockwork. The herbaceous perennials may be easily propagated by seed or division. The seeds of the annual kinds should be sown in a rather dry, warm situation in the open ground. The shrubby evergreens will need the protection of a frame or cool greenhouse in cold northern climates, and are best grown in a mixture of loam, sand, and peat. Young cuttings of most species will root in a pot of sandy soil, with a bell glass placed over them, in a cool house or frame.

A. Barba-Jovis (Jupiter's beard).* *fl.* pale yellow, numerous, in globose, bracteate heads. March. *l.* pinnate, and are as well as the branches,

clothed with silky tomentum; leaflets nine to thirteen, oblong-linear. *h.* 4ft. to 8ft. Spain, 1640. Shrub.

A. erinacea (prickly).* *fl.* bluish-purple; heads few flowered, on short peduncles, bracteate. April. *l.* very few, oval, or oblong. *h.* 6in. to 12in. Spain, 1759. A much branched, spiny, almost leafless, and slow-growing species; hardy in a dry sunny position on the rockery. SYN. *Erinacea hispanica*.

A. Hermanniæ (Hermann's). *fl.* yellow; heads few flowered, nearly sessile in the axils of the upper leaves. April. *l.* almost sessile, simple, or trifoliate; leaflets oblong-cuneated, glabrous or clothed with adpressed pubescence. *h.* 2ft. to 4ft. Corsica, 1739. Shrubby, much branched.

A. montana (mountain).* *fl.* pink or purplish, in dense heads, on peduncles, with a leafy involucre. June. *l.* pinnate, and are as well as the branches, silky and hoary; leaflets numerous, oval-oblong, acute, small, entire. *h.* 3in. to 6in. Alps of Europe, 1769. A very handsome little rock plant, with a dwarf and tufted habit.

A. tetraphylla (four-leaved). *fl.* white; heads axillary, sessile, few flowered. July. *l.* pinnate, the terminal leaflets ovate and large, the

other three small and acute. South Europe, 1640. A procumbent annual.

A. Vulneraria (Common Woundwort).* *fl.* generally yellow, sometimes white, red, or pinkish, in crowded twin heads. Summer. *l.* pinnate, with five or more unequal leaflets; the lower ones smallest. An elegant native herbaceous, perennial, admirably adapted for rockwork. It is plentiful in most dry pastures. There are several varieties, the best of which is *alba*.

ANTIARIS TOXICARIA. This is the famous Upas tree of Java, from which is obtained poison of a most deadly nature. It belongs to the NAT. ORD. *Urticaceæ*.

ANTIGONON (from *anti*, against, or opposite, and *gonia*, an angle). ORD. *Polygonaceæ*. Elegant stove climbers. Flowers racemose, cirrhose at the apex of the rachides; petals five, three outer ones broadly cordate, two inner oblong. Leaves alternate, cordate. Although extremely handsome plants, they are difficult to flower. They seem to succeed best when planted out in a very thoroughly drained border over hot-water pipes or flues, the long climbing stems being trained near the glass in full light.

A. amabile (lovely).* *fl.* bright rose, profusely borne in axillary and terminal racemes. *l.* 3in. to 5in. long, ovate-cordate, and deeply lobed at the base. It is of free slender growth, the young shoots are pubescent, and having a slight reddish tinge. An exceedingly attractive and effective

species.

A. guatemalensis (Guatemala). Probably the same as *A. insigne*.

A. insigne (remarkable).* *fl.* very numerous, borne in tufts along the sides of long racemes or panicles, which terminate in branched tendrils; the calyx, which is the showy part of the flower, has five membranous sepals, the three outer are of a beautiful rosy pink colour, about 1in. in length by rather less in breadth, cordate at the base, oblong, rounded towards the apex; the two inner sepals about the same length as the outer ones, but much narrower, falcate, lanceolate; pedicels ¾in. long. *l.* broadly ovate oblong, deeply cordate at the base, with two rounded lobes; 4in. by 3in., the upper ones smaller, supported on short terete downy stalks. Stems slender, angular, pubescent. Columbia, 1876.

A. leptopus (slender-stemmed). *fl.* numerous; the outer three sepals of a beautiful rose colour, the centre of a much deeper tint; racemes secund, bearing several coloured bracts as well as flowers, and end in a branched tendril. *l.* alternate, cordate, petiolate. Stem slender, sub-pubescent. Mexico, 1868.

ANTIGRAMME. *See* **Scolopendrium**.



Fig. 113. Antirrhinum capsule, with Persistent Style.

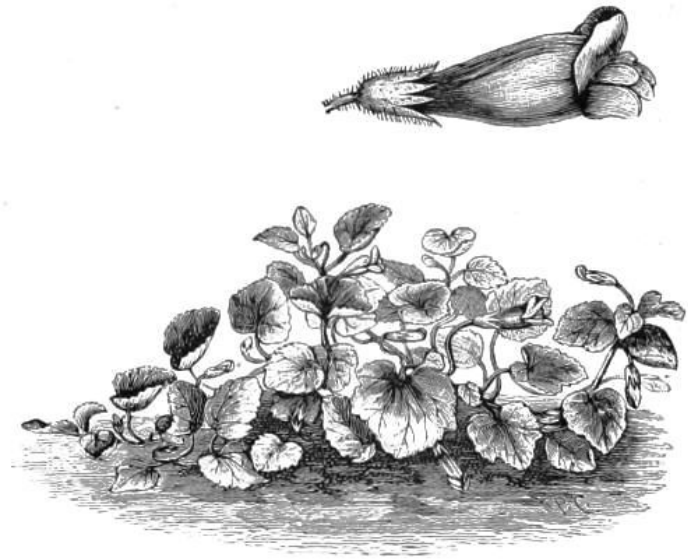


Fig. 114. Antirrhinum Asarina, showing Habit and Flower.

ANTIRRHINUM (from *anti*, like, and *rhin*, a nose or snout; alluding to the shape of the corolla). Snapdragon. Ord. *Scrophulariaceæ*. Hardy herbaceous plants. Flowers in terminal racemes, or solitary and axillary; corolla personate; tube ample, saccate at the base; lobes of the upper lip erect; lower lip

spreading, having the middle lobes smaller than the lateral ones, with an ample bearded palate, which closes the throat. Seed pod or capsule two-celled, upper cell bursting by one pore, lower by two many-toothed pores. See Fig. 113. Leaves entire, rarely lobed. The genus contains several very handsome species, suitable for borders and the rockery, while innumerable varieties have originated from *A. majus*, which are very popular, and extremely useful for bedding purposes; these may be increased by cuttings or seeds; if it is desired to increase certain colours or varieties, the former is the only sure method to adopt. They should be taken in September, when they will readily root in a cold frame, or under a hand glass, or they may be rapidly propagated in gentle heat in spring. Seeds should be sown in July or August, when they will produce good plants by the following season; or if sown in March in warmth, the plants will bloom late in the same year. The "Tom Thumb" strain is especially desirable for bedding, being very dwarf and free. All the other species may be increased by cuttings and seeds treated in the same way. Light soil, well enriched with manure, is most suitable for all of them, especially for the varieties of *A. majus*.



Fig. 115. Flower-spike of Antirrhinum majus.

A. angustifolium (narrow-leaved). Synonymous with *A. siculum*.

A. Asarina (Asarina).* *fl.* axillary, solitary; corolla 1½in. long, white, sometimes tinged with red; palate yellow; tube glabrous, compressed

on the back, marked by purple spots, and bearded by yellow hairs inside. June. *l.* opposite, on long petioles, five-nerved, five-lobed, cordate, and crenated. South France, &c., 1699. A greyish clammy procumbent plant, requiring a warm position on the rockery. See Fig. 114.

A. hispanicum (Spanish). *fl.* in loose spikes; corolla hardly an inch long, purple, with a golden yellow palate; tube villous. Summer. *l.* oblong-lanceolate, contracted at the base, bluntish; lower ones opposite; superior ones alternate, narrower. *h.* 1ft. Spain, 1878. SYN. *A. latifolium*.

A. latifolium (broad-leaved). Synonymous with *A. hispanicum*.

A. majus (large).* Greater, or Common Snapdragon. *fl.* racemose, approximate; corolla 1in. to 2in. long, shades infinite; palate yellow at top, very prominent; tube downy outside. Spring, summer, and autumn. *l.* oblong-lanceolate, 1in. to 3in. long; upper ones narrower, attenuated at both ends, glabrous. Branches erect, usually branched again. *h.* 2ft. Europe (naturalised in Britain). The named varieties are numerous, but it is unnecessary to enumerate any, as an equal amount of variation can be obtained from seed. See Fig. 115.

A. molle (soft).* *fl.* few, at the tops of the branchlets; corolla 1in. long, whitish, with a yellow palate; upper lip striped with purple. July. *l.* opposite, petiolate, clothed with glandular and clammy hairs, about ½in. long, and little more than ¼in. broad; branches procumbent, slender, clothed with woolly hairs. Pyrenees, 1752. A very pretty plant, which should have a warm position on the rockery. *A. sempervirens* comes close to this species.

A. Orontium (Orontium). *fl.* axillary, distant; corolla rose-coloured or white, striped with purple; tube furnished with a few glandular hairs; palate veined with purple; sepals linear-lanceolate, large. June. *l.* oblong-lanceolate, acutish, attenuated at both ends, glabrous, 2in. long. *h.* 6in. to 12in. Europe (British cornfields). Annual. See Fig. 116.



Fig. 116. Antirrhinum Orontium.

A. O. grandiflorum (large-flowered). A variety with larger, paler, and more approximate flowers, and with broader leaves, than the type. Europe (British cornfields).

A. siculum (Sicilian). *fl.* in loose racemes; corolla hardly 1in. long, white or yellowish, rarely purple; tube rather hairy; lobes of the upper lip and the middle lobe of the lower lip emarginate. July. *l.* 1in. to 1½in. long, linear-lanceolate, opposite, alternate or three in a whorl, narrowed into petioles at the base. Branches erect. *h.* 1ft. to 2ft. Sicily, 1804. Syn. *A. angustifolium*.

A. tortuosum (twisted).* *fl.*

disposed in spiked racemes, approximating by threes and fours; corolla (the largest of the genus) purple; tube short; upper lip large. June. *l.* linear, acute, opposite or three in a whorl, 2in. long, attenuated at both ends; upper ones very narrow. Branches erect. *h.* 1ft. to 1½ft. Italy.

ANTONIA. A synonym of **Rhynchoglossum** (which *see*).

ANTROPHYUM (from *antron*, a cavern, and *phuo*, to grow; referring to its place of growth). Including *Polytænium*. ORD. *Filices*. A small genus of stove ferns, very rarely seen in cultivation, all with simple fronds, of firm but fleshy texture, and copious, uniform, hexagonal areolæ. Sori carried along the veins, imperfectly reticulated. For culture, &c., *see* **Ferns**.

A. cayennense (Cayenne). *sti.* 1in. to 4in. long. *fronds* 6in. to 9in. long, 1in. to 1½in. broad, lanceolate-oblong, narrowed at both ends; edge thickened, entire; areolæ half as broad as long. *sori* sub-superficial, often forked. Guiana, &c.

A. coriaceum (leathery). *fronds* 6in. to 8in. long, about ½in. broad, narrowed very gradually from the centre to the base, very acute at the apex, very thick; areolæ very long and narrow, distinctly raised on the upper surface. *sori* quite immersed, sometimes confluent. Himalayas, &c.

A. lanceolatum (lance-leaved).* *fronds* 1ft. or more long, ¼in. to ½in. broad, point acute, edge entire, the lower half narrowed very gradually to the base; areolæ two or three times as long as broad, about three rows between the midrib and the edge. *sori* slender, superficial, often joining. West Indies, southwards to New Grenada, 1793.

ANTS (*Formicidæ*). Well-known pests, easily distinguished from all other insects. There are a great number of species, differing more or less in habits; but, as a rule, they dwell underground in communities, and construct extensive ant-cities, which are occupied by three classes—the neuters or workers (by far the most numerous), the males, and the females. There are often, in addition to these, larger and stronger neuters, known as the "soldiers," or defenders of the community. Ants have a long, slender body, supported on long and slender legs. The head bears a pair of elbowed horns or antennæ, constantly waving about and touching everything the insect comes across. They have powerful mandibles for cutting, sawing, and biting, and it is with these instruments that Ants do mischief in gardens. The winged males and females become mature in summer, and on a warm day they ascend in a body into the air; after a short time, they fall to the ground, the females at once free themselves from the henceforth useless wings, and begin to form new colonies. Vast numbers of eggs are laid, from which issue larvæ, and these soon become pupæ, and then perfect Ants. Some kinds are injurious from their habit (in some species) of collecting aphides

together, and farming them for the sake of the honey secreted by the aphides, and that passes out from their honey-tubes (thus helping to perpetuate the stock of these most injurious insects); and also from the mechanical damage they do in pots, and other receptacles for plants. They likewise cause unsightly hills on lawns and paths, and the large black species that live in decayed wood often injure the framing of greenhouses, &c., when the woodwork has become somewhat decayed. Where fruit, such as peaches or wall pears, are grown, Ants will at times inflict damage, and, therefore, they should be kept away; but this is a comparatively easy matter, as the placing of an obnoxious substance along the base of the walls and around the stems of the trees will deter them. For the extirpation of Ants from indoors, the Arsenical solution described below is most efficacious, but it is extremely dangerous.

Lime. Air-slaked lime plentifully dusted, in warm, dry, weather, over and around the hills and other places infested, will cause the Ants to vacate them in a short time. A thick chalk line drawn round a smooth tree, or across an upright board or post, will render it impassable.

Arsenic. This must be used with the utmost caution, as it is a poison most fatal to animal life. Recipe: 1oz. of ordinary arsenic is placed in an old iron pot with a quart of water, and then boiled until reduced to a pint or a little more of liquid, to which is added ½lb. of coarse sugar. This mixture can either be dropped about the runs and around the nests, or placed in saucers in the Ants' haunts.

Ferrocyanide of Potassium. This is also very dangerous: Ferrocyanide of potassium, 1dr.; raspings

of quassia, 1dr.; and enough sugar to form a syrup. Use in the same way as the preceding.

Calomel and Sugar. Mix together one part of calomel and ten parts of finely-powdered loaf sugar, and lay it in little heaps about their nests and runs; the Ants will eat it and die. Spring is the best season for this method.

Guano, when fresh, if sprinkled on and around their quarters, is said to be efficacious in driving them away.

Camphor. If a piece of camphor, about the size of a filbert, be placed in two quarts of hot water, and this, when cool enough, applied to pot or other plants infested with Ants, the insects will be driven off without injury to the plants.

Bones. Lay a quantity of partially-picked boiled bones in the haunts, and they will be quickly covered with insects. As soon as this occurs, throw the bones into hot water. Before laying them down again, let all superfluous moisture drain off. This is a cheap remedy, and, if persisted in, is very effectual.

Carbolic Acid. This, if of good strength, diluted with about ten or twelve times its bulk of water, and well sprinkled over paths or other places where there is no vegetation, will keep the Ants away. It has, however, an objectionable smell.

Paraffin Oil. Paraffin, mixed with six times its bulk of water, and sprinkled over the nests every few days, will kill and drive away Ants; but the smell is disagreeable.

Quassia. 4oz. of quassia chips, boiled in a gallon of water for about ten minutes, and 4oz. of soap added to the liquor as it cools, if used like the preceding, is

fairly effectual; but this, like the other remedies, must be persisted in for some time.

Fly pans or saucers, nearly filled with thin honey or sweet oil, attract Ants, and they are drowned in them. Ants are very hard to clear effectually out of a place, and therefore it is very desirable, in all attempts to be rid of them, to persist in the above remedies. When not living close to the roots or stems of plants, the best and surest remedy of all is to flood them out or scald them in with boiling water. The specifics are endless, but the best are mentioned above.

ANTWERP HOLLYHOCK. *See* **Althæa ficifolia.**

AOTUS (from *a*, without, and *ous*, an ear; in allusion to the absence of appendages in the calyx, which distinguishes it from its allied genus, *Pultenæa*). ORD. *Leguminosæ*. Elegant little greenhouse evergreen shrubs, with yellow flowers, and simple, linear-subulate leaves, revolute at the margins, alternate or nearly opposite, or three in a whorl. They should be grown in a compost of equal parts loam, sand, and peat, with a little charcoal, and the pots should be well drained. Cuttings of half-ripened wood, made in April, root freely in sand, under a bell glass.

A. gracillima (most slender).* *fl.* yellow and crimson, small, on long, dense, graceful spikes, which are often over a foot long; pedicels short. May. *h.* 3ft. New Holland, 1844. A very pretty slender growing shrub.

A. villosa (soft-haired). *fl.* axillary, disposed in racemose spikes along

the branches; calyx silky. April. *l.* smoothish on the upper surface. *h.* 1ft. to 2ft. New Holland, 1790.

APEIBA (the native name in Guiana.) ORD. *Tiliaceæ*. Very handsome stove evergreen trees or shrubs, clothed with starry down. Flowers large, golden yellow, pedunculate, bracteate. Capsule spherical, depressed, rough from rigid bristles. Leaves broad, alternate, entire or serrate. They thrive in a mixture of loam and peat. The best way to induce them to flower in this country is by cutting a ring round the bark of a large branch; by this means the growth is stopped. Well ripened cuttings should be planted in sand in heat, under a bell glass, which should be tilted occasionally, so as to give a little air to the cuttings, otherwise they are apt to damp off.

A. aspera (rough).* *fl.* golden yellow; peduncles opposite the leaves, branched, many flowered. May. *l.* ovate-oblong, somewhat cordate, quite entire, smooth. *h.* 30ft. to 40ft. Guiana, 1792.

A. Petoumo (Petoumo). *fl.* yellow, similarly disposed to *A. aspera*. August. *fr.* densely clothed with bristles. *l.* ovate-oblong, somewhat cordate at the base, entire, hoary beneath. *h.* 40ft. Guiana, 1817.

A. Tibourbou (Tibourbou).* *fl.* dark yellow. August. *fr.* densely clothed with bristles. *l.* cordate, ovate-oblong, serrated, hairy beneath. *h.* 10ft. Guiana, 1756.

APETALOUS. Without petals.

APEX. The summit or point of anything.

APHELANDRA (from *apheles*, simple, and *aner*, a male; the anthers being one-celled). ORD. *Acanthaceæ*. Very handsome stove evergreen shrubs, mostly of an erect habit of growth, and having handsome shining leaves, which in some instances are variegated. Flowers produced in terminal four-sided spikes—the preponderating colours being brilliant shades of orange or scarlet—conspicuously situated above the foliage; they are exceedingly attractive; corolla ringent, two-lipped, upper lip three-lobed; central lobe large. They bloom generally during the autumn months, and if the plants are removed to a warm dry atmosphere so soon as the flowers begin to open, they will continue much longer in perfection than if left in the moisture-laden atmosphere of the stove. From the time the flower spikes are at first seen till they bloom, the plants will derive much benefit from frequent applications of clear manure water. When the plants have finished flowering, they should be allowed to rest, by reducing the supply of water, but never allow them to shrivel. During this time they may be kept in a house or pit, where the atmosphere is rather dry, with a night temperature of 50deg. to 55deg. Here they may remain till March, when they should be pruned. This operation is commenced by thinning out the weakest shoots altogether, and cutting the others back to one or two of the strongest joints or buds above the old wood in order to keep the plants dwarf and bushy. When pruned, the plants should be placed in the stove, giving moderate supplies of water at the roots, and occasionally sprinkling the stems overhead till growth commences. When the

young shoots have attained an inch or so in length, the plants should be turned out of the pots, removing the crocks and as much of the old soil as can be got away easily, at the same time shortening-in any of the straggling roots. They should then be placed into smaller-sized pots, keeping them rather close, and watering them carefully for a time till growth has commenced. When fairly started, they may be transferred into larger-sized pots, in which they are to flower. During the summer, these plants require a moist atmosphere, with a temperature of 65deg. by night, allowing it to rise 15deg. or 20deg. by day, and whilst active growth is taking place they should be frequently supplied with moisture at the roots, keeping them well exposed on all sides to the light. After growth has commenced, it is not advisable to stop the shoots, for the stouter and stronger they grow up the finer will be the flower spikes when they appear. The compost should consist of equal parts fibry loam, leaf soil, and peat, with a good proportion of sand added. In preparing it, it should be rather lumpy, and, before using, should be warmed to about the temperature of the house in which the plants are grown. Clean pots and perfect drainage are most essential. Cuttings are best prepared from half ripened wood, or taken off when young with a heel. The base of each cutting should invariably be cut clean across. These may be inserted an inch apart, in pots of sandy soil, and plunged in a brisk bottom heat. To obtain young shoots for cuttings, if the old plants break freely after pruning, and very large specimens are not required, when the shoots are 2in. long they should be thinned out, leaving the requisite number of the strongest to form the plant. If the surplus pieces are removed with a slight heel of the older wood, they make good

cuttings, and should be treated the same as the others. These cuttings strike root quickest, and when rooted, if potted into 5in. or 6in. pots, and allowed to grow up without stopping or pinching out the tops, they will flower the first season. Although Aphelandras can be grown into large sized specimens, it will be found to be more generally satisfactory to have specimens of neat and moderate dimensions. The mealy bug and scale insects are very troublesome, and must be kept down, otherwise they will prove most prejudicial to the plants.

A. acutifolia (acute-leaved). *fl.* large, deep vermilion red; the upper lip of corolla concave, and projected forward, the lower one consists of three oblong-obtuse spreading lobes. October. *l.* broad, oblong-ovate, acuminate. Columbia, 1868.

A. aurantiaca (orange-coloured).* *fl.* deep orange scarlet; upper lip of corolla erect, bidentate, concave; lower one spreading horizontally, three lobed. December. *l.* broad, ovate, opposite, dark green, somewhat wavy at the edge. *h.* 3ft. Mexico, 1844.

A. a. Roezlii (Roezl's).* Differs chiefly from the type in the curiously twisted leaves, which are dark green, shaded with a silvery hue between the primary veins; in the brighter scarlet of the flowers; and a few other, but purely technical, points. It is one of the best. Mexico, 1867. SYN. *A. Roezlii.*

A. cristata (crested).* *fl.* brilliant orange scarlet, 2in. or 3in. long, in large terminal branching spikes. August to November. *l.* large, broadly ovate, and tapering to a point. *h.* 3ft. West Indies, 1733. A handsome and continuous bloomer. SYN. *Justicia pulcherrima.*

A. fascinator (fascinating).* *fl.* bright vermilion, in very large spikes. Autumn. *l.* ovate acuminate, olive green, beautifully banded with silvery white, whilst the under side is of a uniform purplish violet. *h.* 1½ft. New Grenada, 1874.

A. Leopoldi (Leopold's).* *fl.* citron-yellow. *l.* opposite, ovate-oblong, acuminate; ground colour on the upper surface dark green, the midrib and primary veins pure white; under surface uniformly pale green. Brazil, 1854.

A. medio-aurata (golden-centred). *fl.* unknown. *l.* ovate-lanceolate, sinuate, bright green, with yellow central brand. Brazil, 1871. SYN. *Graptophyllum medio-auratum.*

A. nitens (shining).* *fl.* glowing vermilion-scarlet, very large, in erect, simple, terminal spikes, which, after the flowers have fallen, are clothed with the imbricating, lanceolate, appressed bracts. *l.* ovate, sub-acute, leathery, brilliant glossy

on the upper surface, dark vinous purple underneath. *h.* 2ft. to 3ft. Columbia, 1867.

A. Porteana (Porte's).* *fl.* in fine terminal heads; corolla and bracts bright orange. *l.* rich green, with metallic silvery-white veins. *h.* 2ft. Brazil, 1854.

A. pumila (dwarfish).* *fl.* orange-coloured; upper lip erect, concave, entire; bracts large, purplish. *l.* large, cordate, ovate-oblong, acute. *h.* 8in. Brazil, 1878. Very distinct from all others.

A. punctata (dotted).* *fl.* bright yellow, in large and rather dense spikes; the spiny-edged long pointed bracts are also yellow, with the exception of the tip, which is green, and forms a pleasing contrast. November. *l.* opposite, elliptic, acuminate; the green midrib is conspicuous in the middle of a white central band, which also extends beside the green veins, this silvery band breaking up on its margin into numerous small white dots, producing a pretty and distinct form of variegation. South America, 1881.

A. Roezlii. A synonym of *A. aurantiaca Roezlii*.

A. variegata (variegated). *fl.* yellow; spike, 6in. long, with bright orange-red bracts. *l.* ovate-lanceolate,

acuminate, dark green with white veins. *h.* 1½ft. Brazil.

APHELEXIS (from *apheles*, simple, and *exis*, habit). ORD. *Compositæ*. A genus of elegant dwarf evergreen greenhouse shrubs. Flower-heads large, solitary, or small and two or more together. Leaves small. These plants are valuable for exhibition purposes, on account of their bright colours, and the length of time they last in perfection; they are included among what are familiarly known as "everlastings." The most suitable soil is a compost of two parts of good fibrous peat and one of leaf mould, with a liberal supply of silver sand, and a few pieces of charcoal added to it. Repot the plants firmly in February, and allow thorough drainage. Cuttings can be made in spring or summer; small half-ripened side shoots are best; and these will root in sandy soil, under a bell glass, in a cool greenhouse.

A. ericoides (heath-like).* *fl.-heads* white. April. *l.* very small, three-cornered, imbricated, appressed; branches numerous, very fine, filiform. *h.* 1ft. Cape of Good Hope, 1796.

A. fasciculata (fascicled). *fl.-heads* purplish, solitary, terminal; peduncles scaly. March. *l.* acerose linear, roundish, downy above; lower spreading; upper appressed. *h.* 2ft. Cape of Good Hope, 1779. There are two or three forms of this species, varying in the colour of the flowers.

A. humilis (humble, or dwarf).* *fl.-*

heads pink, solitary, terminal, opening only in sunshine; peduncles scaly. April. *l.* subulate, erect, imbricate. Branches numerous, slender, covered with white tomentum. *h.* 2ft. Cape of Good Hope, 1810. A handsome greenhouse plant, with much-branched stems, terminated by the flower-head. SYNS. *A. macrantha* and *Helipterum humile*.

A. h. grandiflora (large-flowered).* *fl.-heads* rosy-purple, produced in great abundance. Habit rather dwarf, and free branching. Very highly esteemed.

A. h. purpurea (purple).* *fl.* dark purple, very abundant. *l.* silvery white and shining. A vigorous grower, and perhaps the best for exhibition purposes. It is known in gardens as *A. macrantha purpurea*; also under the name of *A. spectabilis*.

A. h. rosea (rose-coloured).* *fl.-heads* delicate rose, very profuse. Habit very compact and free-branching. A very showy and desirable variety, known in gardens as *A. macrantha rosea*.

A. macrantha (large-flowered). Synonymous with *A. humilis*.

A. sesamoides (Sesamum-like). *fl.-heads* purple and white, sessile, solitary, terminal. April. *l.* acerose

linear, keeled, smooth, appressed. *h.* 2ft. Cape of Good Hope, 1739.

APHIDES, or **PLANT LICE**. These belong to the order *Homoptera*, meaning "same winged," and the name has reference to the fact that the fore wings are uniform in their structure from base to apex, not divided into a leathery base and a membranous tip. Aphides are all minute in size, soft bodied, and generally long legged; the mouth is furnished with a curiously-constructed beak, or rostrum, for sucking the juice of plants; the antennæ, or feelers, are long and slender; the legs have usually two joints in the tarsi, one of which is generally very ill-developed; and near the tip of the abdomen, on the back of a ring, in many kinds, stand two prominent tubes, called honey-tubes, from which a sweet secretion, much sought after by ants, is emitted. They are very destructive, and nearly every plant has its own peculiar Aphis; but among the worst are the cherry fly and bean fly. All these insects are very destructive to the young shoots and foliage of plants, on which they cluster in large numbers, sometimes completely hiding the stems, increasing with marvellous rapidity. They produce eggs in autumn, which lie dormant through the winter, and upon the approach of warm weather in spring, hatch and produce individuals which, during the summer, are viviparous, budding off young insects at a surprising rate, which quickly in turn become possessed of the same marvellous power; hence the enormous number which are produced in so surprisingly short a time. It has been computed that in a few weeks many millions of young might be produced directly or descended from a single female. *See also* **Black Fly** and **Bean Fly**.

The following remedies may be successfully employed:

Tobacco. This is applied, as a rule, in three forms, each of which is useful for particular purposes. Tobacco powder is useful as a dry application to plants where, from any cause, the other modes of employing it are not desirable. It causes no smell, and is useful in conservatories, &c., for that reason. The mode of applying it is to dredge or dust it over the foliage of the plants affected, and to syringe off in from three to thirty hours, according to the nature of the plants. Fumigation with tobacco, if done in a proper way, is very effective, but it leaves an unpleasant smell. The foliage of the plants should be quite dry, and a still day must be chosen for the work; the house should be filled with smoke, but no flame must arise in the burning. The plants should be well syringed the next morning, and full ventilation allowed; if the fumigation is repeated twice or thrice, it will prove very effectual. Tobacco water is made by soaking a pound of coarse shag in 6gals. of hot water, to which ½lb. of size or soft soap has been added. The plants should be dipped into or syringed with this mixture, and well syringed with clean tepid water about twelve hours after. It should not be employed for plants having woolly or hairy foliage. Tobacco paper and cloth are used for fumigating in the same manner as tobacco; but as they vary in strength, more care is necessary, as they sometimes cause the leaves to become spotted. Judiciously employed, they are cheaper than Tobacco.

Quassia. Boil 1lb. quassia chips in 4gals. of soft water, for about ten minutes, and after straining off the chips, add 1lb. of soft soap. Apply in the same way as Tobacco water, and syringe the plants with

clean water after ten minutes or a quarter of an hour.

Soft Soap. This, in proportion of 8lb. to 12gals. of rain water, and 1gal. of tobacco water added after it is cold, is a cheap and good remedy out of doors, and requires the same mode of application as tobacco water.

Soap Suds. Where bleaching powder, or much soda, is not mixed with these, they make a good insect killer for hard-foliaged plants, but should be washed off with clean water in twelve hours. No mixture containing chloride of lime should be used.

Various. Fir-tree Oil, Gishurst's Compound, and Fowler's Insecticide, are all serviceable, if used as directed on the labels. Hardeman's Beetle Powder, applied with the little French powder-bellows which is sold with it, is very efficacious. For outdoor work, nothing surpasses clean cold water, applied often and forcibly with a syringe.

The best mode of clearing Aphis off Beaus, Currants, &c., is to remove the tops of the infested shoots, and to wash the plants with soapy water, or a solution of Gishurst's Compound. In some cases, a good dusting with soot and wood ashes, while the plants are wet, will keep them in check. The "Golden Eyes" or "Lacewing" fly, and also ladybirds, are to be encouraged, as the larvæ of each of these wage incessant war against Aphides, especially the green varieties, and thin them out considerably.

APHROPHORA. *See* **Frog Hopper**.

APHYLLANTHES (from *aphyllos*, leafless, and *anthos*, a flower; the flowers are on rush-like branches). ORD. *Liliaceæ*. A very pretty rush-like hardy perennial, forming dense, erect tufts. It thrives best in sandy

peat, requires a warm sunny situation, and slight protection in winter. Increased by division of the roots, and seeds; the latter should be sown in pots in a cool greenhouse as soon as ripe.

A. monspeliensis (Montpelier).* *fl.*, perianth six-cleft, spreading at the apex, deep blue, nearly an inch across, disposed in a small head, on slender scapes. June. *l.* absent; the very slender scapes are leaflike, with membranous sheaths at the base. South of France, 1791.

APHYLLOUS. Without leaves.

APICRA (from *apicros*, not bitter). ORD. *Liliaceæ*. A group of succulents allied to *Aloe*, and having the following among other characters:—Flowers small, loosely sub-spicate; perianth regular, cylindrical, with short spreading segments; peduncles simple or forked. Plants small; rosette leaves always elongated. Leaves thick, diffuse, never spinosely dentated. They require treatment similar to Aloes, under which genus they are included by some authors.

A. aspera (rough).* *fl.*, perianth ½in. long; raceme loose, 3in. to 4in.; pedicels three to four lines long; peduncle slender, simple, nearly 1ft. *l.* dense, in many rows, spreading, rounded, deltoid, six to seven lines long and broad; face rather flat; middle three to four lines thick; back convex hemispherical, wrinkled. Cape of Good Hope, 1795.

A. bicarinata (double-keeled).* *fl.*

unknown. *l.* dense, in many rows, ascending, deltoid-lanceolate, nine to twelve lines long, six lines broad, dirty green; face flat; middle two lines thick; margin scabrous; back copiously tubercled. Cape of Good Hope, 1824.

A. congesta (congested). *fl.*, perianth six to seven lines, whitish; raceme loose, sub-spicate, about 1ft.; pedicels short; peduncles 6in. long, simple. *l.* dense, spreading, in many rows, deltoid-lanceolate, eighteen to twenty-one lines long, three to four lines thick; back convex; top unevenly keeled towards the margins. 1843.

A. deltoidea (deltoid). *fl.*, perianth greenish, five to six lines long; raceme about 1ft. long, sub-spicate; pedicels short; peduncles 6in., simple or branched. *l.* in five regular rows, spreading, nine to twelve lines long, deltoid, shining green; when mature, upper surface rather flat, apex pungent; middle two to three lines thick; back distinctly keeled upwards; margins and keels minutely serrated. South Africa, 1873.

A. foliolosa (small-leafy).* *fl.*, perianth greenish, five to six lines long; raceme loose, sub-spicate, about 1ft.; pedicels two to three lines long; peduncle 6in., simple. *l.*

dense, spreading, in many rows, rounded deltoid, cuspidate, six to eight lines long and broad, without spots or tubercles; face rather flat; middle one and a half to two lines thick; back obliquely keeled upwards towards the margins. Cape of Good Hope, 1795.

A. imbricata (imbricated). Synonymous with *A. spiralis*.

A. pentagona (five-angled).* *fl.*, perianth whitish, ½in. long; raceme about 1ft., loose; lower pedicels two to three lines long; peduncles 1ft., often branched. *l.* dense, regular, lower ones spreading, upper ones ascending, lanceolate-deltoid, fifteen to eighteen lines long; bottom six to eight lines broad, shining green; face flat; middle three to four lines thick; apex pungent; margin scabrous; back irregularly one to two keeled at top. Cape of Good Hope, 1731.

A. p. bullulata (little-blistered). *l.* irregularly spiral, five rowed; back with spreading close wrinkled tubercles.

A. p. spirella (small spiral). *l.* smaller and more deltoid, 1in. long, six to eight lines broad at the bottom, irregularly five rowed, or as if in many rows.

A. spiralis (spiral).* *fl.*, perianth reddish-white, ½in. long; raceme

loose, nearly 1ft.; pedicels ascending, two to three lines long; peduncles 6in., simple or branched. *l.* dense, in many rows, strong, ascending, lanceolate-deltoid, twelve to fifteen lines long, six to eight lines broad; face almost flat, without tubercles; apex pungent; back swollen, scarcely keeled; margins obscurely crenulated. Cape of Good Hope, 1790. SYN. *A. imbricata*.

APICULATE, **APICULATED**. Terminated in a little point.

APIOS (from *apion*, a pear; in reference to the form of the tubers of the root). ORD. *Leguminosæ*. An elegant little hardy twining perennial, easily trained into almost any shape. It must have a well-exposed, sunny position, and the soil should be of a warm or light sandy nature. Propagated by division of the tubers.



Fig. 117. Apios tuberosa, showing Habit and Flower.

A. tuberosa (tuberous).* Ground Nut. *fl.* brownish-purple, sweet-scented, in axillary racemes. Summer and early autumn. *l.* pinnate. Tubers edible, farinaceous. Habit very light and graceful. Pennsylvania, 1640. Syn. *Glycine Apios*. See Fig. 117.

APIOSPERMUM. A synonym of **Pistia** (which *see*).

APIUM (from *apon*, Celtic for water; in reference to the habitat). Ord. *Umbelliferæ*. This genus contains no species worth growing for ornament, and nearly all are more or less acrid and poisonous. A.

graveolens is the Celery of gardens, for culture of which, *see* **Celery**.

APLECTRUM (from *a*, without, and *plectron*, a spur; flower spurless). ORD. *Orchideæ*. A monotypic genus from North America. A curious, hardy, terrestrial orchid, requiring a shady spot in light loam and leaf mould, moderately damp. Very difficult to cultivate.

> **A. hyemale** (wintry).* *fl.* greenish-brown, large, racemose, borne on a naked scape after the leaves have died down; labellum as long as the sepals; column sessile, rather long, wingless. April. Stem pseudo-bulbous, with one large, broad, ribbed leaf. *h.* 1ft. 1827.

APLOTAXIS. Included under **Saussurea** (which *see*).

APOCARPOUS. Having the carpels or fruit separate, or disunited.

APOCYNACEÆ. A large order of trees, shrubs, or rarely herbs, usually with a poisonous, milky sap. Flowers regular, solitary or corymbose; corolla salver-shaped or campanulate. Leaves simple, opposite, sometimes alternate or whorled. Well known genera belonging to this order are: *Allamanda*, *Nerium*, *Tabernæmontana* and *Vinca*.

APOCYNUM (from *apo*, away, and *kyon*, a dog; adopted by Dioscorides, because the plant was supposed to be poisonous to dogs). ORD. *Apocynaceæ*. Dog's Bane. Perennial erect herbs, with cymose flowers and membranous, opposite leaves. There are several species belonging to this genus, but only the one described below is worthy of being cultivated. They are of extremely easy culture, thriving in any

ordinary soil; and may be propagated by suckers, divisions, or seeds. The best time to divide is just as they are starting into fresh growth in spring.

A. androsæmifolium (Tutsan-leaved).* *fl.* pale red, with darker stripes; corolla campanulate; cymes terminal and lateral. July. *l.* ovate, glabrous, petiolate, pale beneath. *h.* 1ft. to 2ft. Virginia, and Canada, 1683. A very old garden favourite, thriving best in peaty soil, with Azaleas, &c. See Fig. 118.



Fig. 118. Inflorescence of Apocynum androsæmifolium.

APONOGETON (from *apon*, Celtic for water, and *geiton*, neighbour; alluding to the habitat of these plants). Ord. *Naiadaceæ*. Very ornamental aquatic perennials. There are several species, but *A. distachyon* is superior to the others. This species may be cultivated in small tanks or aquaria; it delights in an abundance of light and air, and is perfectly hardy, having become naturalised in many parts of the country. Pot the plants in rich sandy loam and rotten cow manure, using, of course, small pots, if the vessel in which it is to be grown is restricted. When introducing it to large tanks or lakes, commence with

strong, previously well-established plants, in large pots, breaking the latter when the plants are immersed. Place them in positions where the water is about 1ft. 6in. to 2ft. deep; they will then rapidly increase by offsets and seeds, and, when established, will flower nearly all the year round. The other kinds will thrive with the same treatment; but they are neither so hardy nor so vigorous, and should only be grown in small tanks or aquaria.

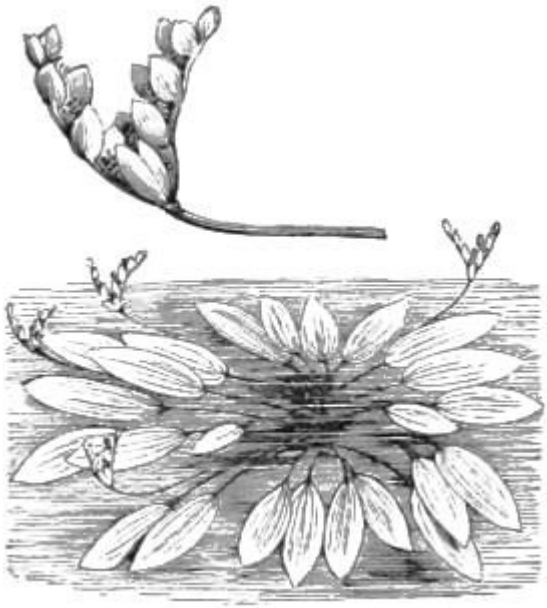


Fig. 119. Aponogeton distachyon, showing Habit and Flower-spikes.

A. angustifolium (narrow-leaved). *fl.* white. July. Cape of Good Hope, 1788. Half hardy.



Fig. 120. Aponogeton distachyon, showing Flower-spikes, Leaf, and Root.

A. distachyon (two-spiked).* Cape Pond Weed; Winter Hawthorn. *fl.* with a delicious Hawthorn-like perfume; petals none; bracts, or showy portion oval, entire, white; anthers purple-brown; scape two-spiked, each spike being from 2in. to 4in. long. *l.* oblong-lanceolate,

entire, bright green, on long stalks, floating. Cape of Good Hope, 1788. See Figs. 119 and 120.

A. monostachyon (simple-spiked). *fl.* pink. September. *h.* 1ft. East Indies, 1803. Stove species. Rare.

A. spathaceum junceum (rush-like).* A very pretty, but rare, half-hardy aquatic plant, with the forked inflorescence having both bracts and flowers suffused with a delicate blush colour. *l.* rush-like, standing clear up out of the water. South Africa, 1879.

APORETICA. A synonym of **Schmidelia** (which *see*).

APPENDICULATE, APPENDICULATED. Having appendages.

APPLANATE. Flattened out.



Fig. 121. Apple Blossom.

APPLE (*Pyrus Malus*). The Apple is one of the most useful, and probably most largely cultivated, of our hardy fruits. It is known as the Crab in its wild state, and is indigenous to Britain and to all the temperate and warmer parts of Europe. It is supposed that the progenitors of the varieties now grown were introduced to this country at various times from the Continent, and not obtained here as direct improvements on the native Crab. Those now cultivated are extremely numerous, and include good varieties that can be made to prolong the season all the year round. Apart from its great value as a fruit,

the apple is a strikingly handsome tree when in flower (see Fig. 121). A fruiting branch is shown at Fig. 122.



Fig. 122. Fruiting Branch of Apple.

Propagation. Seeds are sown extensively, chiefly for raising stocks to graft approved sorts on; also with a view to raising new varieties. The seeds do not retain their germinative properties very long, consequently they must be sown soon after being taken from the fruit. As grown in this country, they are generally sown in the autumn, transplanted the following year, and so on until they are of sufficient size for Grafting purposes. The standard of excellence being at present so high, improved forms raised from seed are comparatively scarce.

Grafting. This method of propagation is the one generally adopted for most purposes, the stocks being previously prepared for size or height of tree required. Cordon and other dwarf-trained trees

should be worked near but not below the ground, while standards are best worked on stocks of the desired height. The practice of working standard trees low, and growing the scion to form the stem of the future tree, is not recommended, as many of the tenderer sorts will not grow straight or strong enough for the purpose. Whip-grafting is the most preferable mode adopted. The scions should be selected from healthy trees not later than January, and laid in singly in the ground until the stocks have slightly advanced in growth, which is generally about the middle of April. Several other methods of Grafting may be adopted with success, but the one above recommended is considered the best.

Budding. Apples may be successfully propagated by Budding, and this method is practised much more now than formerly. It has many advantages, as it requires to be performed at a season when there is not so much work in hand. It should be done in damp, dull weather, if possible, as the weather if dry soon destroys the buds. July and August is the proper time for the purpose. The stocks and woods from which the buds are taken should be as much as possible in the same condition.

Propagation by Cuttings, Layers, &c. This system may be made use of in the case of new varieties or where it is desired to increase any one variety with a limited number of scions, but the results are uncertain—at least in the case of cuttings; consequently, it is much better to resort to the safer method of Grafting.

Pruning. See **Pruning**.

Training. See **Training**.

Planting. The best time to plant is as soon as most of

the leaves have fallen, which is generally about the end of October. The roots being then in an active state, and the ground still retaining a certain amount of heat, they will form new roots before winter, which is a material advantage. Where it is impossible to plant at this time, it may be done in suitable weather any time during the winter, but it is best not deferred till spring. It is important in planting that the soil should be moderately dry and free from frost; this condition cannot always be obtained during winter. The effects of soil and situation have a very important bearing on the Apple, specimens of the same sort from different places being often hardly recognisable. Although not over fastidious in the matter of soil as far as growing is concerned, the best results are obtained where it is of a rich loamy character and well drained. Dry, sandy soils invariably produce canker, while the trees are often overgrown with lichens in undrained land. The addition of heavier loam, or sometimes trenching and mixing the sub-soil with that at the top, will convert light soils into those suitable for Apple culture; while, on the other hand, heavy soils may be improved by drainage, the addition of lime, vegetable refuse, burnt earth, and other matters. Rank manure should on no account be used anywhere near the roots, but a little well-decayed manure, mixed with the soil or used as a mulching, is beneficial. The site best suited is an open, though not exposed one, with a south, south-east, or south-west aspect. Shelter from north-east winds in spring, which destroys the bloom, and from west and south-west winds in autumn, which blow down the fruit, should be the aim of cultivators. Planting in a valley should be avoided on account of spring frosts. In Planting, care must be taken to make the bottom of

the hole tolerably firm, and slightly raised under the base or bole of the tree. The roots should then be carefully spread out all round, and if any have been ruptured in transplanting, cut them clean off on the upper side, thus inducing new roots to be formed near the surface. The soil should be trodden firmly after a quantity has been filled in, if it is in a dry, suitable condition, as previously recommended. Secure with stakes in proportion to the size of tree, or injury will be caused by the wind. The distance at which Apple trees are planted varies considerably. Standards in orchards may be planted in good soil, from 20ft. to 40ft. apart, especially if they are strong-growing culinary sorts. Pyramids may be planted from 5ft. to 15ft., according to size; and similar distances will suit Bush trees. The oblique Cordon system of training admits of a large number of varieties being cultivated in a small space, as they may be planted as close as 18in. or 2ft. apart. Horizontal Cordons should be planted about 5ft. asunder, and one branch trained each way. Watering will be necessary after planting in most cases, especially should the winter and following season be at all dry. Thinning the fruit is sometimes advisable for obtaining good specimens, but it is not generally necessary, at least with many of the shy-setting sorts. If, however, the crop should be exceptionally heavy, it is best to thin the fruit, or the tree may be unable to make and ripen its wood for the crop of the succeeding year.

Gathering. The three following tests are sure indications of the gathering period: (1) The apples will begin to fall of their own accord; (2) their seeds will be plump and brown in colour; and (3) the fruit will separate with a mere touch from the trees; the second test may be said to be infallible. All Apples

should be gathered before the end of October, for none will bear frost with impunity. They must be gathered in dry weather, and handled with the greatest care, laid gently in baskets and trays, in single file only, and conveyed to the store room.

Storing. The simplest and best method is in choosing or forming some room or place free from extremes of heat and cold, dryness or damp, where a temperature of about 45deg. is maintained. A current of air is not necessary. The shelves should be made of poplar, sycamore, lime, or other white wood. Deal, oak, ash, elm, and almost all other woods, give a bad taste to the fruit. One sheet of paper—and paper only—should be placed under the fruit. They ripen best, and are of the highest flavour when left fully exposed to the free atmosphere of the fruit room, and in order to preserve a more even temperature the light should be shut out. Early and late ripening varieties must be stored in separate places, as well as all inferior or injured fruit. The plan of isolating each fruit by packing in tissue paper, sand, burnt earth, or other substances, often destroys the flavour of the fruit, and possesses no material benefit otherwise.

Diseases. Apple Mussel Scale, Apple or Codlin Grub, Canker, Mildew, American Blight, Scale, and Insect Pests, such as Caterpillars, Maggots, and Weevils, *see* under their separate headings.

The following are some of the best varieties in cultivation:—

Adams' Pearmain. Dessert. Fruit medium, very handsome; flavour juicy and sugary. December to March.

Alexander. Kitchen. Very large,

showy, and good. September to December.

Alfriston. Kitchen. Very fine, large, white flesh. November to April.

Ashmead's Kernel, or **Cockle Pippin**. Dessert. Fruit below medium; flavour very rich and sugary. This variety is, according to Mr. Rivers, much esteemed in Gloucestershire. November to January.

Bedfordshire Foundling. Kitchen. Fruit large. One of the finest and most useful sorts, a great bearer. February to May.

Bess Pool. Kitchen. Fruit large. Good late cooking apple. December to May.

Betty Geeson. Kitchen. Fruit large, produced in great abundance. February to May. A valuable sort.

Blenheim Pippin. One of the best kitchen sorts. November to February.

Boston Russet. Dessert. Fruit medium; flavour very sugary and rich, similar to the Ribston Pippin. An excellent American variety. January to May.

Brabant Bellefleur. Kitchen. Fruit large, round, pale yellow, red-streaked. A most useful cooking variety, also useful for dessert. November to April.

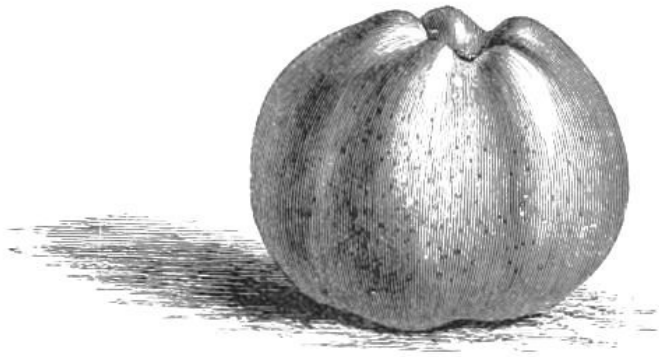


FIG. 123. APPLE, CALVILLE BLANCHE.

Calville Blanche. Dessert. Fruit large; flavour first-class. October to December. See Fig. 123.

Cellini. Kitchen. Fruit perfect in form, size, colour, and quality. October to January.

Claygate Pearmain. Dessert. Fruit medium; flavour rich, aromatic, excellent, same as Ribston Pippin. January to May.

Coe's Golden Drop. Dessert. Fruit small, with a crisp and juicy flavour. November to January. A delicious variety.

Cornish Aromatic. Dessert. Fruit medium; flavour rich, juicy, and aromatic. October to December.

Cornish Gillyflower. Dessert. Fruit medium; flavour very rich, quite aromatic. October, November to January. An excellent variety, thriving best in a warm situation.

Court of Wick. Dessert. Fruit medium, very handsome; flavour somewhat similar to Golden Pippin. December to March.

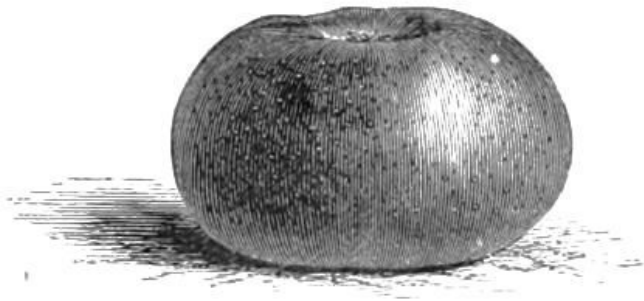


FIG. 124. APPLE, COURT PENDU PLAT.

Court Pendu Plat. Dessert or kitchen. Fruit medium, rich russet brown, of first-rate quality, and the tree is a good cropper. November to April. See Fig. 124.

Cox's Orange Pippin. Dessert. Fruit medium, very handsome; flavour rich aromatic. October to December. One of the best apples grown.

Cox's Pomona. Kitchen. Fruit very large, of superior quality. October.

Devonshire Quarrenden. Dessert. Fruit medium, excellent quality, and handsome. July to September. A very prolific sort.

D. T. Fish. Kitchen. Fruit large, roundish, of a clear straw-colour, with small specks of russet, slightly

flushed with crimson on the side where the sun strikes it; flavour sub-acid. November to January. A fine and handsome variety.

Duchess of Oldenburgh. Kitchen. Fruit large, red-striped. August to October. A very desirable and handsome Russian variety.

Duke of Devonshire. Dessert. Fruit medium; flavour crisp, juicy, rich and sugary. December to March.

Dumelow's Seedling, or **Wellington**, or **Normanton Wonder**. Kitchen. Fruit firm, large, and somewhat acid. November to March.

Early Harvest. Dessert. Fruit medium; flavour juicy, excellent, with a pleasant sharpness. July to September. According to Mr. Rivers this variety is equally good for cooking or dessert, and is a very fertile tree on the Paradise stock.

French Crab. Kitchen. Fruit large, pale green, firm, acid. An excellent sort, and the longest keeper.

Golden Pippin. Dessert. Fruit small, very excellent flavour. November to January. A well-known and highly-esteemed sort.

Golden Reinette. Dessert. Fruit rather small, yellowish red, streaked with red; flavour excellent, sweet

and rich. One of the best and most useful of dessert apples. October to December.

Gravenstein. Kitchen. Fruit large, handsome, sweet and crisp. November to January. A very prolific sort.

Greenup's Pippin. Kitchen. Fruit very large. February to May. A vigorous grower and abundant bearer.

Irish Peach. Dessert. Fruit medium, yellowish-green, very early; flavour juicy, excellent. July and August. A very good variety, often known as Early Crofton.

Jolly Beggar. Kitchen. Fruit large, pale yellow, tender and juicy. November to January. A very desirable sort and an extraordinary cropper.

Keddlestone Pippin. Dessert. Fruit small, yellow or golden colour, specked with russet; flavour delicious, highly aromatic. December to March. An excellent variety.

Kerry Pippin. Dessert. Fruit medium, firm, yellow, and red; flavour sugary and rich. September to October.

Keswick Codlin. Kitchen. Fruit large and early. August to October.

An admirable sort for market purposes.

King of the Pippins. Dessert. Fruit medium, yellow and red; flavour juicy and rich. October to January.

Lady Henniker. Kitchen. Fruit yellow, with crimson streaks near the sun, highly flavoured, and with a pleasant perfume. February to May. An excellent sort, suitable for dessert or kitchen.

Lodgemore Nonpareil. Dessert. Fruit small; flavour rich, sugary, and aromatic. January to May. An excellent sort.

Lord Suffield. Kitchen. Fruit very large, white, soft, excellent for sauce and tarts. August to September.

Manx's Codlin. Kitchen. Fruit large. September and October. One of the finest and most useful of kitchen sorts.

Mère de Ménage. Kitchen. Large and good. October to March.

Mr. Gladstone. Dessert. Fruit large and handsome, very early, scarlet cheek, striped and shaded; of excellent quality. July and August. New.

New or **Winter Hawthornden**. Kitchen. Fruit very large, excellent. November to January. An extraordinary bearer, one of the best

for sauce and cooking.

Nonsuch. Kitchen. Fruit large, juicy. August to October. An admirable sort, unequalled for sauce and cooking.

Norfolk Beefing. Kitchen. Large and good flavour, excellent keeper, most useful for baking whole and preserving. November to July.

Norfolk Greening. Kitchen. Fruit medium; rather acid. Keeps till April or May.

Northern Spy. Dessert. Fruit large, tender; flavour highly aromatic. December to May.

Old Nonpareil. Dessert. Fruit medium, tender, and juicy. November to January. A prolific variety.

Pitmaston Pineapple. Dessert. Fruit small; flavour very rich. July to September. According to Mr. Rivers this variety is a very abundant bearer on the Paradise stock; it is not a vigorous grower.

Red Astrachan. Dessert. Fruit good size, bright; flavour delicate and rich. August to September.

Red Ingestrie. Dessert. Fruit very pretty bright red next the sun, on a yellow ground, flesh pale yellow; flavour brisk and sparkling, like the Golden Pippin in quality. August and

September. An excellent sort.

Red Juneating, or **Margaret**. Dessert. Fruit medium, early, very good quality. July and August. A well-known sort, with numerous synonyms.

Red Quarrenden. Dessert. Fruit under medium, bright scarlet; flavour crisp and sweet. August. One of the best summer sorts.

Reinette du Canada. Dessert. Fruit greenish-yellow and brown, large; flavour juicy, brisk, sub-acid. November to May. See Fig 125.

Reinette Grise. Dessert. Flesh yellowish-white, sugary, pleasant; flavour sub-acid. November to April. It does best on the Paradise stock, and is an abundant cropper. See Fig. 126.

Ribston Pippin. Dessert. Fruit greenish-yellow and red, medium; flavour rich, aromatic, excellent. October to December.

Sam Young. Dessert. Fruit small, yellowish with russet spots; flavour delicious, tender, and juicy. October to December. An excellent Irish sort.

Scarlet Crofton. Dessert. Fruit medium, yellow and red; flavour crisp, juicy, and sweet. October to December.

Scarlet Nonpareil. Dessert. Fruit

well coloured, large; flavour crisp and juicy. January to March.

Small's Admirable. Kitchen. Fruit large, green, crisp, sweet, and juicy. November to January. A prolific cropper.

Stamford Pippin. Dessert. Fruit large, with a brisk flavour and an agreeable aroma. November to January. A very desirable sort.

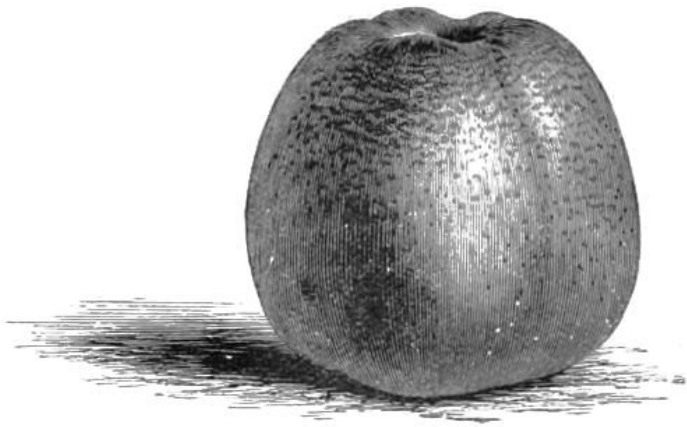


FIG. 125. APPLE, REINETTE DU CANADA.

Sturmer Pippin. Dessert. Fruit medium; flavour brisk and rich. February to June.

Syke House Russet. Dessert. Fruit small; flavour very rich. January to May. An excellent sort.

Tower of Glammis. Kitchen. Fruit yellow, very large, square-shaped, crisp, and excellent. February to May. A very excellent sort.

Van Mons Reinette. Dessert. Fruit small, with a rich, aromatic, and excellent flavour. November to January.

Waltham Abbey Seedling. Kitchen. Fruit large. November and December. An admirable sort.

Warner's King. Kitchen. Fruit large, handsome, and good. November to March.

Worcestershire Pearmain. Kitchen. Fruit large, conical, of a very brilliant colour; flavour crisp and juicy. August to October. A splendid variety, said to be as prolific as Lord Suffield.

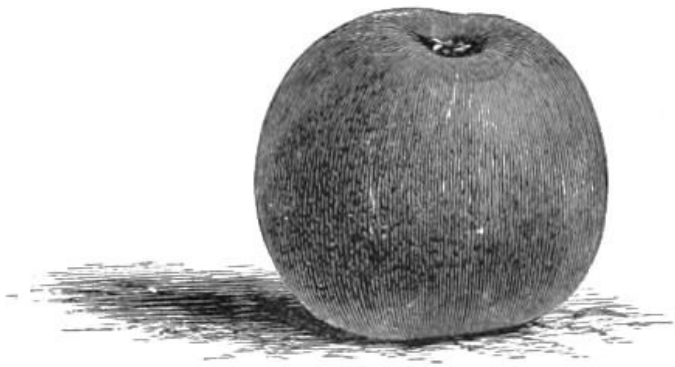


FIG. 126. APPLE, REINETTE GRISE.

White Juneating. Dessert. Fruit small, very early, and good quality, but a bad keeper. July and August. A prolific sort.

White Nonpareil. Dessert. Fruit

medium, very delicious. March to June. A very desirable sort.

Winter Quoining, or **Queening**. Dessert. Fruit very bright, almost red; flavour excellent. November to May. An excellent sort, useful for dessert or culinary purposes.

Winter Strawberry. Dessert. Fruit yellow, medium, striped with red; flavour brisk aromatic. November to March. A very useful sort.

Wormsley Pippin. Kitchen or dessert. Fruit of an excellent quality, large, pale green; excellent for kitchen or dessert. September to October.

Yorkshire Greening. Kitchen. Fruit large, juicy, tender. November to January.

For Cordons the following are the best:—Betty Geeson, Coe's Golden Drop, Cox's Orange Pippin, Duke of Devonshire, King of the Pippins, Lodgemore Nonpareil, Northern Spy, Reinette du Canada, Ribston Pippin, Scarlet Nonpareil.

For Pyramidal, Bush, and Espalier Trees, the best are:—Adams' Pearmain, Ashmead's Kernel, Boston Russet, Claygate Pearmain, Cornish Gillyflower, Court of Wick, Court Pendu Plat, Cox's Orange Pippin, Early Harvest, Golden Pippin, Golden Reinette, Irish Peach, Keddlestone

PIPPIN, KERRY PIPPIN, RED INGESTRIE, RED QUARRENDEN, REINETTE DU CANADA, RIBSTON PIPPIN, SAM YOUNG, SCARLET CROFTON, SCARLET NONPAREIL, STURMER PIPPIN, SYKE HOUSE RUSSET, WORMSLEY PIPPIN. The following Kitchen sorts are well adapted to this method:—ALFRISTON, BED-FORDSHIRE FOUNDLING, BRABANT BELLEFLEUR, CALVILLE BLANCHE, CELLINI, COX'S POMONA, D. T. FISH, DUCHESS OF OLDENBURGH, DUMELOW'S SEEDLING, JOLLY BEGGAR, KESWICK CODLIN, LORD SUFFIELD, MANX'S CODLIN, NEW HAWTHORNDEN, NONSUCH, WALTHAM ABBEY SEEDLING, WARNER'S KING.

For Cold and Exposed Situations, the following are the best:—BESS POOL, CLAYGATE PEARMAIN, FRENCH CRAB, GREENUP'S PIPPIN, KESWICK CODLIN, NONSUCH, STURMER PIPPIN, TOWER OF GLAMMIS, WINTER STRAWBERRY, WORMSLEY PIPPIN.

For Cottage Gardens: ALEXANDER, BEDFORDSHIRE FOUNDLING, BLENHEIM PIPPIN, KING OF THE PIPPINS, MANX'S CODLIN, NEW HAWTHORNDEN, REINETTE DU CANADA, RIBSTON PIPPIN, STURMER PIPPIN, WALTHAM ABBEY SEEDLING, WARNER'S KING, WORMSLEY PIPPIN.

APPLE BERRY. *See* **Billardiera.**

APPLE-BLOSSOM WEEVIL (*Anthonomus pomorum*). This is a small beetle of a reddish-brown colour, with three inconspicuous stripes of a paler colour behind

the head; the wing cases show a large pitchy-coloured blotch, with oblique striæ and yellowish spots thereon. The female busily engages herself in piercing the flower buds; while the male may be usually seen flying about the trees during the breeding season, which, of course, varies according to the earlier or later expansion of the buds. The female, by means of strong jaws at the end of the long proboscis, bores a hole in the bud, in which she lays a single egg, finally closing the opening, then passing on to other buds. The laying season lasts for two or three weeks, or, indeed, as long as the buds remain unexpanded; eggs are never laid in open blossoms. In warm weather, the eggs are hatched in six or seven days, usually about the end of April, into small, white, legless maggots, which feed upon the stamens and pistil; hence, although the petals are normally coloured, and expand, the flowers ultimately wither, and in some seasons very serious consequences have arisen from these injurious little pests. The maggot is fleshy, whitish, with a few hairs and a black, hard head; in a few days, it turns into a brown chrysalis or pupa, which, in turn, is changed into the Weevil, only about a month having elapsed from the deposition of the egg till the Weevil is developed. It feeds upon the foliage during summer, and hybernates in crannies of the bark, or under the soil at the base of the trees, during winter, waking up in the following spring to go through the same performances as its parents.

Remedies. Some of the methods advised for the extirpation of the American Blight will prove very useful for the destruction of this pest. Clear away all useless portions of the bark and rubbish round about the tree during the winter, and many will be destroyed. Place bandages of tarred cloth around the

stem in spring; this will prevent the females crawling up, as they seldom fly. If a white cloth is placed beneath the tree affected when in bud, and the tree is severely shaken, a large number will be caught, as the Weevil falls to the ground when alarmed. Timely thinning of the trees, allowing the free admission of light and air, is also a very effectual preventive, as it has been proved that the greatest ravages are committed where neglect of this has been the rule; and that, on the other hand, in proportion to its being done, the pest has been lessened in numbers.

APPLE MUSSEL SCALE (*Aspidiotus conchiformis*). This insect attacks the bark of Apple and Pear-trees. It is in outward appearance like the half of a mussel shell. Under the scale is the insect. It is closely allied to the true scale insects, and has similar habits. The scales are about ⅛in. long, brown, and wider at one end than at the other. The female is like a fat, green, fleshy maggot, without jointed limbs. The eggs of this curious insect are not laid, but simply remain in the body of the mother until she dies, thus leaving a protecting shield or case from which the hatched larvæ emerge. To get rid of this insect, therefore, the females containing eggs should be destroyed. It differs from most other species in the absence of the long tail filaments. If numerous, this Scale causes the trees to become sickly and unfruitful. It is difficult to extirpate.

Soft-soap Lather. When the leaves fall, in autumn, the trees should be treated with a stiff sash-tool, and all the Scale rubbed off, keeping the brush just moist, and not rubbing the buds. Applied for two seasons, this should clear the trees. All loose bark should be removed.

Seal Oil is sometimes recommended as a good

remedy: but oils are rather unsafe applications to the bark of trees, especially of the young branches.

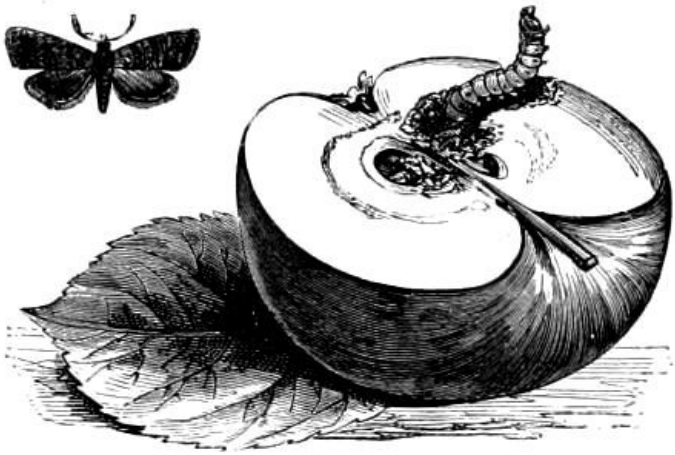


Fig. 127. Codlin Moth and Grub (Carpocapsa pomonana).

APPLE OR CODLIN GRUB (*Carpocapsa pomonana*). During the month of May, the well-known Codlin Moth (see Fig. 127) lays its eggs in the calyces, usually one in each, of the young, quickly-growing apple. The moth itself is a small insect; the fore-wings are grey, prettily speckled with delicate, darker streaks, and with a curved golden mark on the hinder part, inclosing one of a reddish-brown colour. The hind wings are usually dark, as is also the body. The caterpillar, when hatched, is white, with black head and neck, and with four rows of black marks along the whole body. The colours soon, however, become less decided, taking an indistinct brownish or grey hue. After being hatched, the caterpillar gnaws its way down the fruit, keeping clear of the core, and gradually forces its gallery towards the rind of the fruit, which it finally pierces, the opening serving as the outlet for the dirt. When nearly full grown, it pierces the core and feeds upon

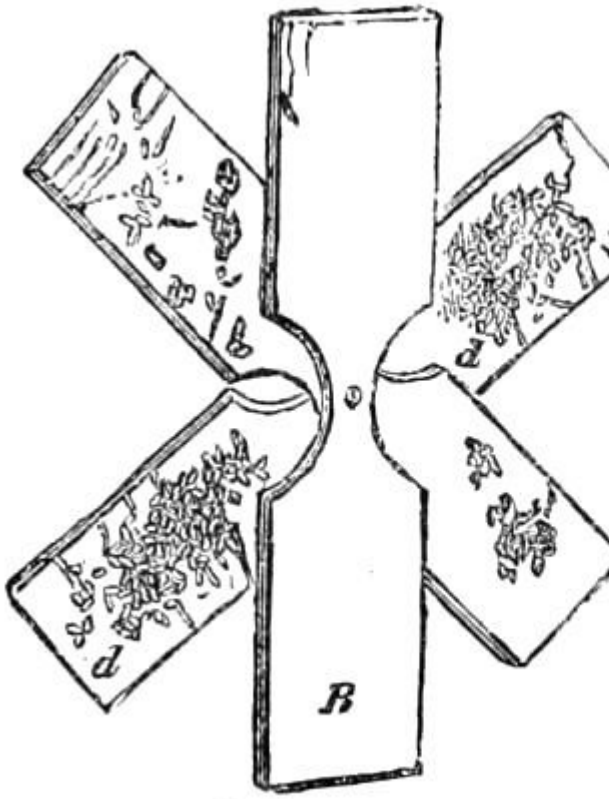
the pips, which injury speedily causes the fruit to drop. The insect then emerges therefrom, and finds a suitable shelter in a cranny of the bark, where it spins a cocoon; and, according to British authorities, it remains in the larval state for some weeks, finally assuming the chrysalis form, and thus passing the winter; the moth emerges the following season. Shortly after development, the moths pair, the female depositing eggs in the fruit in June or July, according to the season.

Practically, there is no preventive; but the following hints will serve to greatly reduce the numbers. All apples that fall ere they are ripe should be picked up as promptly as possible, and be given to the pigs; or pigs should be turned into the orchard to clear off the fallen fruit. The following is the only serviceable remedy:

Hayband Trap. This is simply a loosely made hayband twisted around the stems of the trees, about 1ft. from the ground. The grubs, in searching for a suitable place in which to make a cocoon, will generally choose the bands. At the end of the season, all the haybands should be collected and burnt, and the stems of the trees from which they were removed should be cleared of any cocoons which may adhere to them. All loose bark and other rubbish should be removed from the tree trunks, and also from the ground below.

APPLE OR CODLIN GRUB TRAP. An exceedingly ingenious and effective method of alluring that obnoxious pest, the Apple Grub. The trap (Fig. 128) consists of two, three, or more thin pieces of board, 12in. to 20in. in length, and 2in. to 4in. wide, with a screw (*a*) through their centre. The screw must be long enough to be firmly driven into the trunk of the

tree, so as to hold the boards in position. Small slips of wood (*b*) are inserted between the boards, to keep them sufficiently open to allow of the entry of the grubs, as shown at *d*. The boards are cut on each side of the screw, as at *c*, to facilitate their separation when fastened together by the silken threads of the grubs, and to better expose the latter when the trap is opened. This handy trap, which is of American origin, is very cheap. A great number of them may be collected with little trouble, submitted to a killing heat, and replaced again; and they can be used either on the ground or on the trees. As regards killing the grubs when caught, Mr Weir, the inventor, says: "The quickest and best way is to have a large tin pan, bent in on one side, so as to fit closely to the trunk of the tree. When you reach the tree, drop upon your knees, place the depression in the pan against the trunk of the tree, hold it there by pressing your body against it, and you have both hands free to open the trap. When opening it, many of the pupæ or chrysalids will fall into the pan. The trap must be turned clear around, as many will be found between it and the bark. A person will open and kill the worms in from four hundred to eight hundred traps in a day."



B, OPEN.

FIG. 128. APPLE OR CODLIN GRU

APPOSITE. Placed side by side.

APPROXIMATE, APPROXIMATED, APPROXIMATING. Near together.

APRICOT (*Armeniaca vulgaris*). The Apricot, or, as it was formerly written, "Abricock," is a much esteemed and luscious fruit. It is said to have been introduced into this country during the reign of Henry VIII. The Apricot is one of the earliest flowering of fruit-trees

(see Fig. 129), and is generally in bloom during February. This fact is a great drawback, as it is a difficult matter to save the flowers from destruction by the spring winds and frosts. The fruit (see Fig. 130) contains less acid than most stone fruits, and in appearance it is perhaps the handsomest of all. Success with its culture in many gardens is by no means certain, but with careful preparation of borders and protection of the flowers in spring, satisfactory results are often obtained. Large quantities of fruit are annually imported to this country from France; but their quality and flavour cannot be compared with that of good home-grown produce.



Fig. 129. Blossom of Apricot.

Propagation is effected by seeds or budding. The stones, selected from the best varieties, may be sown as soon as the fruit is ripe, in August or September, in light rich soil, and covered with about 2in. of earth, over which a little litter should be spread during winter. After one season's growth, the plants should be lifted, and the tap roots slightly cut back if the trees are intended for walls. They should then be planted in nursery lines, allowing about a yard between the rows, and 2ft. from plant to plant.



Fig. 130. Fruiting Branch of Apricot.

Budding is the most general mode of propagating Apricots. They are frequently budded from the beginning to the middle of June on seedling, and also on plum stocks, of which latter the Mussell, Saint Julien, Brussels, and Black Damson are the best. For dwarf trees, the stock should be budded about 1ft. from the ground. There are many disadvantages in having a great length of stem. "Rider" trees require a stem from 3½ft. to 6ft.; half-riders, 2½ft. to 3ft. Grafting by the Whip method is sometimes employed, but, for many reasons, it is much inferior to Budding.

Planting, &c. South-west and western aspects suit the Apricot best, but the fruit has been ripened in warm localities on walls facing several points north. Large

areas of garden wall (see Figs. 131 and 132), the walls of stables, barns, outbuildings, and two sides of at least hundreds of cottages, might thus be utilised for the cultivation of this tree. If well drained, almost any garden soil will bring these fruits to perfection; light, fibrous, rather sandy loam will, however, prove most satisfactory. There should be a considerable depth of soil; a yard is not too much, provided it be on a dry base, which is most important. Heavy soils may be improved for Apricot culture by the addition of an equal portion of light loam, mortar rubbish, or charred refuse. In furnishing walls, the distance apart may vary from 2ft. between Cordons, to 12ft., 15ft., or even 20ft. between Fan-shaped trees. The roots should be carefully arranged, interlayered at all points with fine soil, and the whole covered to a depth of 3in. or 4in. Not only should the roots have a good covering of suitable earth, but a secondary one of litter, or other light material, should be added, to render them frost proof in winter, and drought and heat proof in summer. Newly planted trees should, on no account, be allowed to get dry at the root. A thorough soaking of soft rain, or manure water, will often save a crop, and restore the trees, when all other surface remedies or appliances fail. Surface sprinklings overhead with the garden engine, in the afternoons of bright days, are beneficial, and help to keep the foliage clean and healthy. So soon as the trees are cleared of their fruit, attention should be directed to the maturation of the wood. All superfluous shoots should be removed, any excess of growth left on the shoots cut back, and every effort made to perfect the wood already made, rather than force the tree to make more. Unless the weather be very dry, water should not be applied after this stage.

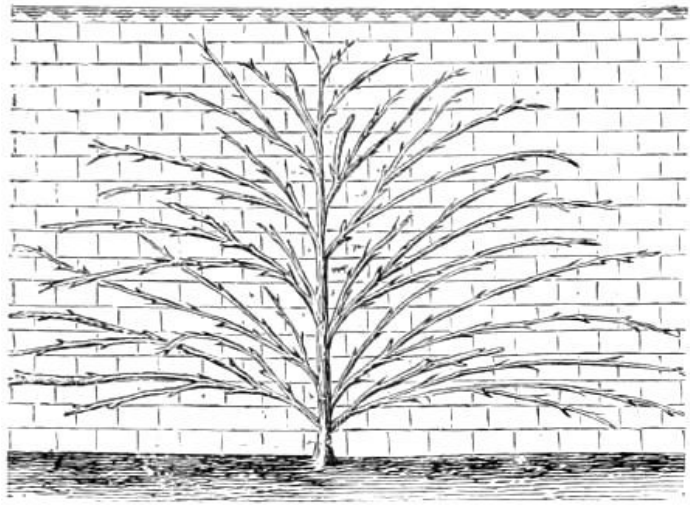


Fig. 131. Apricot Tree, showing method of Wall Training.

Protection. It is almost hopeless to expect a crop unless the blossoms are protected, by mats or other means, from spring frosts. Temporary wooden copings, from 1ft. to 2ft. wide, laid on iron brackets, are indispensable for warding off storms, and keeping other coverings away from the flowers. These should not be put up till the trees are just bursting into bloom, and may safely be removed about the end of May. A few fish or other nets, spread over the trees, afford considerable resistance to the radiation of heat. This is assuredly one of the easiest, if not one of the most efficient, modes of protection. Frigi-domo and other thick shadings are sometimes used, but they require to be removed from the trees in the day time. The thinner nets mentioned are generally not in use for other purposes at this time of year, and may remain over the trees altogether. Glass copings are the best, but, being rather expensive, they cannot be used by the majority of cultivators. They have, however, been

applied with good results to trees that had previously failed.

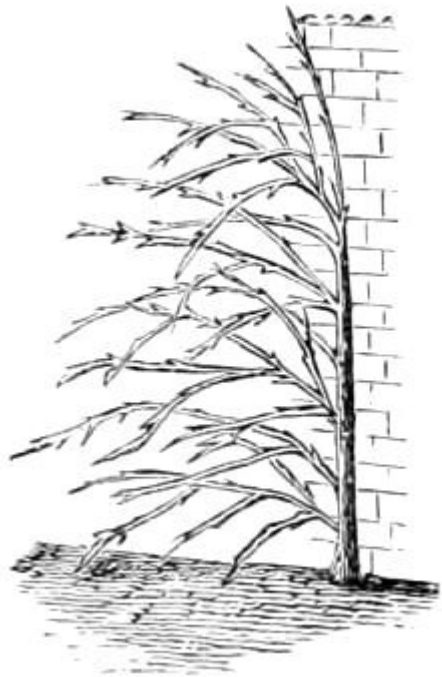


Fig. 132. Apricot Tree, showing method of Training suitable for Gable Ends of Cottages.

Cropping, &c. Thinning of the fruit needs early and careful attention. The average of 3in. apart may be chosen for a maximum yield. As the fruit approach maturity, overhanging leaves, or branches of young wood, must be removed, to admit sun and light to properly ripen and colour them. Apricots for preserving should be gathered quite dry, and with the sun upon them. For dessert, they should be plucked in the morning, and placed in a cool room till wanted.

Under Glass. The Apricot will hardly bear forcing. It

is more sensitive to heat than almost any other of our semi-hardy fruits. Practically, it is found that a confined atmosphere, or the slightest excess of heat, brings its blooms off in showers, and this, of course, mars all prospect of fruit. But in cold climates and northern latitudes under glass is the best and only means of growing them. Should red-spider appear, it is proof that the roots or the atmosphere, probably both, have been too dry; more moisture, and syringing over the leaves, are the surest remedies. The borders need to be about 2ft. or 2ft. 6in. deep, of any light rich soil. Fresh planted trees should be frequently syringed overhead before and after the flowering period. After they have become fully established, less overhead sprinkling is needed. During all the earlier stages of growth, and until the fruit are stoned, an artificial temperature of 45deg. should not be exceeded. After that stage, the fruit will bear a heat of 50deg. or 55deg. It is hardly safe or desirable to exceed the latter under glass, and unless abundance of air is given, 55deg. may bring off the fruit, even at an advanced stage. A thorough soaking, at intervals of fourteen days during the height of the growing season, may be applied; and, should the trees be heavily cropped, manure water may be given at every alternate watering. It is also a good practice to mulch the surface of heavily cropped trees with 3in. or 4in. of good dung. The fruit should, however, be freely thinned to distances of from 4in. to 6in. apart at the most. There are three general methods of growing them under glass: The trees may be trained on trellises or walls; grown as natural standards, tall or dwarf; and as bushes, either planted out or in pots.

Varieties. The varieties of Apricot, unlike most other fruit, are not numerous; and the following will be

found in every way representative and satisfactory:

Blanche, or **White Masculine**. A small and delicate fruited sort. Fruit pale whitish-yellow, tinged with brownish-red next the sun, covered with a fine white down; rich, delicate, and sugary.

Blenheim, or **Shipley's**.* Very early and prolific. Colour deep yellow; flesh medium, rich, and juicy. Ripe in July.

Breda.* A small sort, of excellent quality. Colour deep orange; flesh firm, juicy, and rich. Hardiest sort grown.

Kaisha.* Fruit round, much smaller than Moorpark. Colour pale citron; flesh tender, rich, juicy; flavour delicate and delicious; kernel very sweet.

Large Red. The deepest coloured of all. Fruit very large; colour deep reddish-orange; flesh rich and juicy; kernel bitter.

Moorpark.* The sort most generally grown; large, handsome, and of excellent quality. Colour brownish-orange; flesh rich, juicy, and sweet. It is one of the best and most useful sorts in cultivation.

Peach, or **Grosse Peche**. Distinct and very desirable. Fruit very large;

flesh rich, firm, and juicy. One of the very best.

Royal.* Not unlike Moorpark, but with a more robust constitution, and less given to limb dying. Fruit large, dull, yellow, rich, and juicy.

Turkey.* A good variety. Colour pale yellow; flavour rich and juicy; flesh firm.

For modes of Training and Budding, Diseases, Insect Pests, &c., full information will be found under each individual title.

APTERANTHES. *See* **Boucerosia.**

APTEROUS. Without wings.

AQUATIC PLANTS. The culture of Aquatic Plants, both indoors and in the open air, has been greatly neglected of late years; they are, therefore, rarely seen to perfection in places other than where their culture is made a speciality. Generally speaking, they are most easily grown. The following stove and greenhouse genera are well worth attention: *Aponogeton*, *Cyperus*, *Damasonium*, *Herpestis*, *Limnocharis*, *Nelumbium*, *Nymphœa*, *Ouvirandra*, *Pistia*, *Pontederia*, *Salvinia*, *Thalia*, *Trianea*, *Victoria*. Many species belonging to some of the foregoing genera are hardy, as are also the following: *Alisma*, *Butomus*, *Calla*, *Hottonia*, *Menyanthes*, *Nuphar*, *Polygonum*, *Sagittaria*, *Trapa*, *Typha*, *Villarsia*.

AQUATICUS. Living in water.

AQUATILIS. Living under water.

AQUIFOLIACEÆ. *See* **Ilicineæ**.

AQUILEGIA (from *aquila*, an eagle; in reference to

the form of the petals). Columbine. ORD. *Ranunculaceæ*. Erect hardy perennial herbs with fibrous roots. Flowers solitary or panicled, drooping; sepals five, petaloid, deciduous; petals five, concave, spurred; spurs very large, produced downwards into hollow tubes, and frequently curved at the extremity; carpels five, sessile, free. Radical leaves on long stalks, twice or thrice ternate, with trifid-toothed, usually blunt segments. Too much praise can scarcely be lavished upon this elegant genus of plants. They prefer a moist and sheltered situation, with exposure to the sun. The more robust species will thrive in ordinary garden soil, but the rarer and more delicate kinds require a good friable sandy loam and leaf soil, with good drainage. Seed is produced in abundance, and must be sown very thinly, as soon as practicable after being ripe, in a shady place or in pans in a cold frame. When up, and strong enough to remove, the seedlings may be planted out where they are to bloom, allowing every plant at least 9in. each way. The strong-growing kinds may be placed in the border, the dwarf ones on the rockery. When in bloom, the inferior sorts should be weeded out, retaining only the best varieties. To obtain seed true of any species, it is absolutely necessary to plant the separate kinds far apart, and cover them with fine muslin, to prevent the access of insects to the flowers, as none are more easily cross-fertilised. Division of the root is the only way to perpetuate any particular variety with certainty, unless seed is saved in the way mentioned, or imported from the native habitats of particular species. There are many beautiful hybrids, as well as species, in cultivation.

A. alpina (alpine).* *fl.* from 2in. to 3in. in diameter when expanded,

deep blue or blue and white, on leafy, two to three-flowered stems; spurs straight, but somewhat incurved at the apex, one-half shorter than the petal limb. May. *l.* with segments deeply divided into linear lobes. *h.* 1ft. Alps of Switzerland, in shady humid places, 1731. Plant this on the rockery.

A. arctica (Arctic). A form of *A. formosa*.

A. atropurpurea (dark purple). *fl.* dark purple or bluish violet, about 1in. or 1½in. in diameter when expanded, two or three in a head; spurs straight, equal in length with the petals' limb; sepals about as long as the petals. May. *l.* petioled, biternate. *h.* 2ft. to 3ft. Siberia. Border plant.

A. aurea (golden).* A synonym of *A. chrysantha flavescens*.

A. Bertoloni (Bertoloni's).* *fl.* about 1in. across, blue-violet throughout; sepals about ¾in. long, rounded; petals about the same length; spurs very short, knobbed; stems two to four flowered. June and July. *l.* small, dark green, and glaucous. A very pretty little alpine, growing about 1ft. high. SYN. *A. Reuteri*.



Fig. 133. Aquilegia cærulea.

A. cærulea (sky-blue).* *fl.* several on a stem, blue and white, sometimes more or less tinted with lilac or claret, rarely pure white, when expanded 2½in. to 3in. in diameter; spur very slender, nearly straight, green tipped, about 2in. long. April to July. *l.* large, biternate. *h.* 9in. to 15in. Rocky Mountains, 1864. A very lovely species for the border or base of the rockery. Syns. *A. leptoceras*, *A. macrantha*. See Fig. 133.

A. c. alba (white).* *fl.* the same size and form as the type, white throughout. Rocky Mountains. A very rare and lovely variety; sometimes met with under the name of *A. grandiflora*.

A. c. hybrida (hybrid).* *fl.* blue and white, not so wide across as the type, but more numerous, and the plant has a much more vigorous habit. Of garden origin.

A. californica (Californian).* A form of *A. formosa*.



Fig. 134. Aquilegia canadensis, showing Habit and Flower.

A. canadensis (Canadian).* *fl.* scarlet, mixed with yellow, less than

1in. in diameter; spur straight, longer than the limb; styles and stamens protruding; sepals acutish, a little longer than the petals' limb. April to June. *l.*, segments three-parted, bluntish, and deeply toothed at the apex. *h.* 1ft. to 2ft. North America, 1640. Border or rockery; very pretty. See Fig. 134.

A. chrysantha (yellow-flowered).* *fl.*, sepals primrose yellow, spreading horizontally in full expansion, nearly or quite 1in. long, tinted claret at the tip; limb of petals deeper yellow, not quite so long; spur straight, very slender, divergent, 1½in. to 2in. long; stems many-flowered. May to August. *l.* biternate. *h.* 3ft. to 4ft. California, 1873. One of the finest of all hardy perennials for the border.

A. c. flavescens (yellow). *fl.* of a uniform bright canary yellow, tinged with red; spur somewhat shorter than in *A. canadensis*, and slightly incurved. California, 1872. SYN. *A. aurea*.



Fig. 135. Aquilegia glandulosa.

A. eximia (choice). Synonymous with *A. formosa*.

A. formosa (handsome).* *fl.*, sepals bright red, usually less than 1in. long, with an obtuse green tip; limb of petals yellow, about half as long

as the sepals; spurs ½in. to ¾in. long, slender in the lower half, nearly straight, distinctly knobbed at the tip; stems many-flowered. May to September. *l.* biternate. *h.* 2ft. to 4ft. North America. Border. The following are synonyms and varieties: *A. arctica*, *A. californica*, *A. eximia*, and *A. f. truncata*, revealing only trivial differences. There is a very beautiful hybrid known in gardens as *A. californica hybrida*, with the sepals and petals yellowish, or tinged with orange, while the long slender spurs are orange red; it is one of the handsomest of all. All the forms are very showy, and well worth growing.

A. fragrans (fragrant).* *fl.* white or pale claret purple, finely pubescent, very fragrant; sepals about 1½in. long, not reflexing, twice longer than the broad petals' limb; spur slender, slightly curved, knobbed at the top, same length as the petals; stems few-flowered. May to July. *l.* biternate. *h.* 1½ft. to 2ft. Himalayas, 1839. This requires a warm position.

A. glandulosa (glandular).* *fl.*, sepals bright lilac blue, about 1½in. long, more than twice the length of the petals' limb; petals white; spur ¼in. long, or but little more, stout, much incurved; stems one to three-flowered. Spring. *l.* biternate. *h.* 8in.

to 12in. Siberia, 1822. Extremely pretty. See Fig. 135.

A. g. jucunda (pleasant). *fl.* rather smaller. Very handsome little plants, freely hybridised, and it is necessary to keep raising fresh batches, as they are scarcely more than biennial.

A. glauca (glaucous). *fl.* white, tinted claret, fragrant; sepals 1in. long, not reflexing; limb of petals ¾in. long; spur straight, or a little curved, about ⅓in. long; stem three to four-flowered. June. *l.* biternate. *h.* 1ft. to 1½ft. Himalayas, 1839. Rather tender; plant in a warm dry position.

A. leptoceras (slender-horned). A synonym of *A. cærulea*.

A. macrantha (large-flowered). A synonym of *A. cærulea*.

A. olympica (Olympic).* *fl.* large, delicate mauve blue; petals white, rather shorter than the sepals; spur stout, short, obtuse. *l.* bi- or triternate, glaucous. *h.* 1½ft. 1880. Mount Olympus. See Fig. 136.

A. pyrenaica (Pyrenean).* *fl.*, sepals bright lilac blue, about 1in. long, but not quite as much broad; limb of petals about ½in. long, and half as broad; spur slender, nearly straight, or rather incurved, nearly or quite ¾in. long, scarcely knobbed at the end; stem one to three-flowered,

with small and little compound deep green leaves. Summer. *h.* 9in. to 12in. Pyrenees, 1818. Plant on the rockery.

A. Reuteri (Reuter's). Synonymous with *A. Bertoloni*.

A. sibirica (Siberian).* *fl.* bright lilac; sepals very blunt, 1in. or a little more in length, spreading or slightly reflexing when fully expanded; limb of petals sometimes white, about ½in. long; spur stout, much incurved, ½in. to ¾in. long; stems many-flowered, glabrous. Summer. *l.* biternate. *h.* 1ft. Siberia, 1806. Rockery species. Here are referred, by Mr. Baker, *A. bicolor*, *A. Garnieriana*, and *A. speciosa*. See Fig. 137.

A. thalictrifolia (Thalictrum-leaved). *fl.*, sepals oblong, acute, lilac blue, about ½in. long; limb of petals about as long, and rounded at the top; spurs slender, not quite as long as the sepals; stems about three-flowered. Summer. *l.* with three-stalked segments cut into deep oblong lobes. *h.* 2ft. Tyrol, 1879. Entire plant clothed with fine pubescence.

A. viridiflora (green-flowered). *fl.*, sepals oval-oblong, shorter than the petals; spurs straight and longer than the petals; stems two to three-flowered. *h.* 1ft. to 1½ft. Siberia,

1780. Border. Rather a pleasing and sweet-scented green-flowered species, but not very ornamental.

A. vulgaris (common). Common Columbine. *fl.* variously coloured; sepals ovate acute, about 1in. long, and half as broad; limb of the petal rarely exceeding ¾in. long, and half as much broad, rounded at the apex; spur much incurved, stout, knobbed at the end, as long as the petals; stems many-flowered. Spring and early summer. *l.* biternate. England, &c. There are numerous varieties of this very handsome species, both double and single-flowered.

A. v. alba (white). *fl.* pure white.

A. v. a. fl.-pl. Double white flowers.

A. v. cærulea nana fl.-pl. Very dwarf, with double deep blue flowers.

A. v. hybrida (hybrid). *fl.*, sepals lilac purple, oblong-lanceolate, less than 1in. long; limb of the petals white, about ½in. long; spur scarcely incurved.

A. v. Vervæneana. This variety has pretty yellow mottled foliage.



Fig. 136. Aquilegia olympica, showing Habit and Flower.

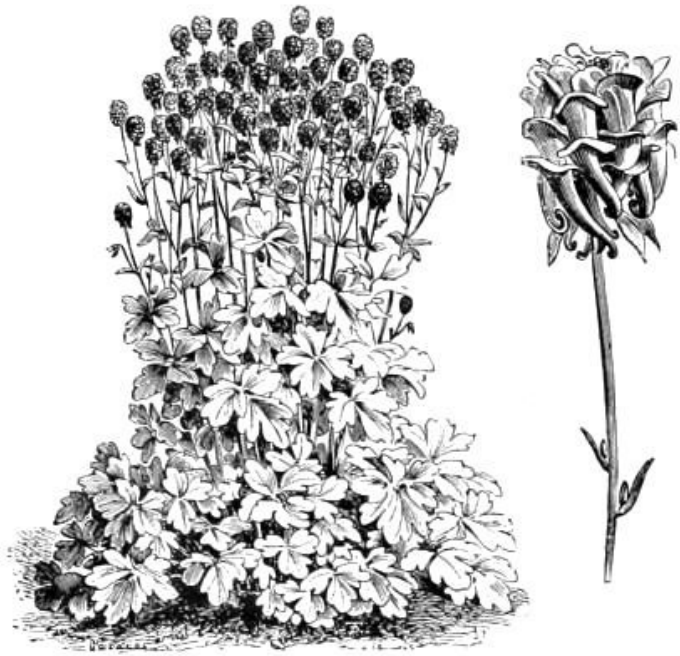


Fig. 137. Aquilegia sibirica flore-pleno, showing Habit and Flower.

A. v. Wittmanniana (Wittmann's). *fl.* large, bright lilac purple; sepals ovate-acute, 1in. to 1¼in. long, more than half as much broad; limb of petals white, about half the length of sepals; spur curved. A very fine variety.

The following names are also met with in gardens, some of which represent specific forms, but none are effective as garden ornaments: *advena*, *Burgeriana*, *Haylodgensis* (hybrid), *grata*, *longissima*, *nevadensis*, *oxysepala*, &c.

AQUOSUS. Watery.

ARABIS (origin of the word not clear). Wall Cress; Rock Cress. ORD. *Cruciferæ*. Hardy perennial trailers, except where otherwise stated. Flowers mostly white; racemes terminal; pedicels bractless. Radical leaves usually stalked; cauline ones sessile or stem-clasping, entire or toothed, rarely lobed. Most members of this genus are peculiarly well adapted for rockwork and the alpine garden, both from their natural hardihood as well as their early and profuse flowering habits. They are of the easiest possible culture in any dry soil. The perennial species may either be increased by divisions of the root, by cuttings, placed in a shady border during the summer, or by seed. The latter may be sown outside, or in pans, in spring, when most of them will germinate in two or three weeks. The annuals and biennials are for the most part devoid of any cultural beauty.

A. albida (whitish).* *fl.* white; racemes terminal; pedicels longer than the calyx. January to May. *l.* few-toothed, hoary, or downy with branched hairs; radical ones obovate-oblong; cauline ones cordately sagittate, clasping the stem. *h.* 6in. to 9in. Tauria and Caucasus, 1798. SYN. *A. caucasica*.

A. a. variegata (variegated).* A very pretty variegated form for edgings.



Fig. 138. Arabis alpina, showing Habit and Flowers.

A. alpina (alpine).* *fl.* white, smaller than those of *A. albida*; racemes terminal; pedicels longer than the calyx, which is smoothish. March to May. *l.* many-toothed, lanceolate, acute, villous with branched hairs; radical ones somewhat stalked; cauline ones cordate, clasping the stem. *h.* 6in. European rocks, in sunny places, 1596. There are one or two varieties, including a variegated-leaved form, in cultivation. See Fig. 138.



Fig. 139. Arabis arenosa, showing Habit and Flowers.

A. arenosa (sand-loving).* *fl.* rose coloured, very rarely white or bluish; petals obovate; pedicels spreading. April to July. *l.* villous, with forked hairs; radical ones pinnatifid, with the upper lobes much larger than the lower; cauline ones deeply toothed. Stem branched, hispid, with simple hairs. *h.* 6in. Middle Europe, 1798. See Fig. 139.

A. blepharophylla (fringed-leaved).* *fl.* rosy purple; petals roundish, narrowing to the base, with slender claws. Spring. *l.* naked, except the margins, which are fringed with very stiff hairs; radical ones spathulate; cauline ones oblong, sessile. *h.* 3in. to 4in. California, 1874. This succeeds best in a cool frame, where it will flower in January.

A. caucasica (Caucasus). A synonym of *A. albida.*

A. lucida (shining).* *fl.* white; petals

entire, narrowed at the base, twice as long as the calyx. Summer. *l.* obovate, thickish, shining, clasping the stem. *h.* 4in. to 6in. Hungary, 1790. A very pretty species, with a dwarf habit; it is especially adapted for edgings, borders, or rockwork.

A. l. variegata (variegated).* A great improvement upon the type, being broadly edged with yellow, and the green somewhat lighter. When grown in tufts or as edging, it is very effective, and should be prevented from flowering. This exceedingly desirable variety is a gem for the rockwork, and when seen in crevices, or in bold tufts, it is very striking. It must be increased by slips or rootlets, which should be taken in early summer.

A. mollis (soft). *fl.* white, in terminal racemes. May to July. *l.* grossly toothed, somewhat pubescent, with small stellate hairs; lower ones on long petioles, cordate-roundish; cauline ones ovate-cordate, clasping the stem. *h.* 2ft. Caucasus, 1823.

A. petræa (rock).* *fl.* white; petals ovate, with stalks. June. *l.* smooth, ciliated or scabrous, with simple or bifid radical ones on longish stalks, entire, toothed; cauline ones oblong-linear, entire, or toothed. *h.* 3in. or 4in. Britain.

A. præcox (early). *fl.* white; petals obovately cuneated, double the length of the calyx. April to June. *l.* oblong, acute, sessile, quite entire, smooth. Stem covered with close pressed rigid hairs. *h.* 6in. to 9in. Hungary.

A. procurrens (procurrent). *fl.* white; petals obovate, double the length of the calyx. May and June. *l.* ovate, quite entire, smooth, ciliated with two-parted hairs; radical ones narrowed into a petiole; cauline ones sessile, pointed. Stolons creeping. *h.* 9in. Servia, 1819. There is a brilliantly variegated form of this pretty species well worth growing.

A. rosea (rosy).* *fl.* rosy purple; petals oblong, somewhat wedge-shaped, double the length of the calyx; pedicels longer than the calyx. May to July. *l.*, cauline ones oblong, somewhat cordate, and rather stem-clasping, scabrous with branched hairs. *h.* 1ft. Calabria, 1832.

A. verna (spring). *fl.* small, purple, with a white claw; pedicels shorter than the calyx. May to June. *l.*, cauline ones cordate, clasping the stem, toothed, scabrous with three-parted hairs. *h.* 3in. to 6in. South Europe, 1710. The best annual species.

ARACEÆ or **AROIDEÆ**. An extensive order of

herbaceous plants, with tuberous rhizomes. Flowers on a spadix, unisexual or hermaphrodite, protected by a spathe. Leaves large, radical. Well known genera belonging to this order are: *Alocasia*, *Arum*, *Caladium*, *Colocasia*, and *Dieffenbachia*.

ARACHIS (from *a*, without, and *rachis*, a branch; plant branchless). Ground or Earth Nut. ORD. *Leguminosæ*. A stove annual, of economical value. Corolla resupinate; calyx a long tube, with a bilabiate limb; ovary stipitate, inclosed in the tube of the calyx; the stipe at first short, but afterwards becoming elongated. Sandy loam is the soil most suitable for their cultivation. Seeds should be sown in heat; and, when the plants have grown to a sufficient size, they should be potted off singly, and placed among other stove annuals. After the plant has finished flowering, and the pods begin to lengthen, the pedicels force them into the earth, where they ripen their seeds.

> **A. hypogæa** (underground). Monkey Nut. *fl.* yellow, five to seven together in the axils of the leaves. May. *l.* abruptly-pinnate, bearing two pairs of leaflets, without any tendril; stipulas elongated, adnate to the petioles. *h.* 1ft., or procumbent. South America, 1812. See Fig. 140.

ARACHNIMORPHA. A synonym of **Rondeletia** (which *see*).

ARACHNOID. Resembling a cobweb in appearance; seeming to be covered with cobweb, in consequence of the entanglement of long, white hairs.



Fig. 140. Arachis hypogæa, showing Leaf, Flower, &c., and Cluster of short wrinkled Pods.

ARALIA (meaning unknown). Ord. *Araliaceæ*. This widely-grown genus includes stove, greenhouse, and hardy, herbaceous and shrubby plants. Flowers inconspicuous, umbellate, the umbels usually disposed in panicles; petals five, inserted on the margin of the disk; stamens five (see Fig. 142).

Leaves usually compound. These plants are of moderately free growth, and the majority are easy to manage. Those requiring indoor treatment thrive well under the ordinary routine of management. One most important requirement, however, is that they must be kept well supplied with water at the roots. The finer, or stove varieties, should be potted in a mixture of sandy loam and peat, with the addition of a little fibrous leaf soil, and sufficient sand to keep the whole porous. The stronger growing kinds thrive in a richer compost. Propagation by cuttings of the roots is a common and very successful method. To obtain the roots, one of the strongest plants should be turned out of the pot, and the roots should be cleared of soil by shaking or washing it out; the requisite number of pieces should then be selected. As each piece is removed, it should have the end nearest the stem cut horizontally, to distinguish it from the other or furthermost end. In planting cuttings of the roots, it is best to place the end nearest the stem uppermost. The pieces may be left about 2in. long, and should be inserted in pots, well drained, and filled with sandy soil, leaving the tops of the cuttings about level with the surface of the soil. A square of glass must be placed over the top of each pot, plunging them in moderate bottom heat. The stems of the plants from which the roots have been taken may be cut into pieces 1in. or 1½in. long, leaving an eye or bud near the top; a slice of half the shoot may be taken off opposite the bud. When prepared, these pieces should be pressed into pots of sand or sandy soil, and plunged into bottom heat. The stems may be cut down without disturbing the roots; in that case, if the pots are plunged in bottom heat, and kept moderately supplied with water, they will probably throw up several suckers or shoots

from the roots. These, if taken off with a portion of root to each, and placed in small sized pots, will, with a little care, soon make useful plants. All the hardy species and most of the greenhouse ones are propagated readily by cuttings or pieces of roots. Some of the stove species, however, are very difficult to increase, except by grafting. Among these are *A. leptophylla*, *A. Veitchii*, &c. These should be worked on stocks of *A. Guilfoylei* or *A. reticulata*, the latter being the better of the two. Cuttings of either of these strike readily, and stocks fit for grafting are easily procured. In sheltered and warm positions, the greenhouse species are admirably suited for sub-tropical gardening, either planted singly or in groups. *See* also **Dimorphanthus**, **Fatsia**, **Hedera**, **Heptapleurum**, **Monopanax**, **Oreopanax**, and **Panax**.

A. canescens (greyish). A garden synonym of *A. chinensis*.

A. Chabrierii (Chabrier's).* *l.* alternate, pinnate, about a foot long; pinnæ opposite, 6in. to 9in. long, linear-lanceolate, deep green, with a heavy crimson midrib. 1882. Suitable for table decoration. A charming stove species.



Fig. 141. Aralia chinensis.

A. chinensis (Chinese).* *fl.* white; panicles terminal; peduncles umbelliferous. *l.* petiolate, coriaceous, woolly on both surfaces when young (only); pinnæ seven, ovate, serrated at the apex, erect and distinct. *h.* 5ft. to 6ft. 1838. This species, if planted in a soil with a dry porous bottom, will prove to be hardy. Syn. *A. canescens*, of gardens. See Fig. 141.

A. concinna (neat). *l.* unequally pinnate; pinnæ lobed and serrate.

Stem spotted. New Caledonia, 1879. A handsome stove species, but very rare. SYNS. *A. spectabilis*, *Delarbrea spectabilis*.

A. crassifolia (thick-leaved). A synonym of *Pseudopanax crassifolium*.

A. edulis (edible).* *fl.* numerous, white; umbels globose, axillary and terminal, united into simple or compound racemes. Summer. *l.*, lower ones pinnate, with five leaflets, or three pinnate, with divisions of three to five leaflets; upper ones generally simple, with stalked leaflets, having a cordate base, ovate, acute, finely toothed, downy. *h.* 4ft. to 6ft. Japan, 1843. Hardy, herbaceous, perennial, hairy, and spineless.

A. elegantissima (most elegant).* *l.* digitate, on long dark green footstalks, which are mottled with white; leaflets seven to ten, filiform, and, being pendulous, impart a very graceful character to the plant. Stem straight, erect. South Sea Islands, 1873. Stove species, excellent for table decoration.

A. filicifolia (fern-leaved).* *l.*, leafstalks sheathing at the base, and terete in the upper part, expanding into a broad leafy limb which is impari-pinnately divided; pinnæ opposite, deeply pinnatifid, bright

green, with a purplish midrib. Stem and leafstalks purplish, thickly marked with oblong white spots. Polynesia, 1876.

A. gracillima (most graceful). Synonymous with *A. Veitchii gracillima.*

A. Guilfoylei (Guilfoyle's).* *l.* pinnate, on long smooth terete petioles; leaflets oblong-elliptic, bluntish, from three to seven, they are sometimes obscurely lobed, and irregularly spinose, serrate, varying in size from 2in. to 3in. long, neatly and evenly margined with creamy white, the surface being in addition occasionally splashed with grey. Stem erect, copiously dotted with lenticular markings. South Sea Islands, 1876. Stove species.

A. heteromorpha (many-formed).* *l.* sometimes ovate-lanceolate and serrated, and at others bifid or even trifid at the apex, about 6in. to 8in. or 9in. long, bright shining green. A very desirable species, of robust and compact habit.

A. japonica (Japanese). Another name for *Fatsia japonica.*

A. Kerchoveana (Count Kerchove's). *l.* digitate, almost circular in outline; leaflets nine to eleven, spreading, elliptic-lanceolate, conspicuously serrated or undulated margins, of a

deep glossy green relieved by a pale midrib. 1883. A very elegant slender-stemmed plant from the South Sea Islands, and likely to prove valuable for decorative purposes. Stove species.

A. leptophylla (slender-leaved).* *l.* compound, bearing often seven or more petiolate leaflets of a somewhat pendent character, and dark green in colour. 1862. An elegant stove or greenhouse slender growing species.

A. longipes (long-stalked). *l.* digitate, long stalked, and rather distant; leaflets oblanceolate acuminate, slightly undulated at the edge; petioles elongated. Stems simple. North Australia, 1882. A very distinct erect-growing evergreen stove species.

A. maculata (spotted). *l.* of a light green colour; leaflets oblong-acuminate, in about four pairs. Stem erect, which, as well as the stalks of the leaves, is of a blackish-purple hue, thickly spotted with green dots. This peculiar colouring is very distinct and conspicuous. South Pacific Islands. Stove species.

A. Maximowiczii (Maximowicz's).* *l.* on long stalks, palmately five to seven-lobed; lobes lanceolate, 3½in. long, serrate. Japan, 1874. An elegant and distinct hardy shrub,

with erect spiny stem. SYN. *Acanthopanax ricinifolium*.

A. monstrosa (monstrous).* *l.* pendent, pinnate; leaflets three to seven, oblong elliptic, deeply and irregularly serrated (this serration sometimes takes most fantastic forms), broadly margined with creamy white, the surface blotched with grey. South Sea Islands, 1880. Stove species.

A. nudicaulis (naked-stemmed).* *fl.* greenish; scape trifid at the apex, shorter than the leaf, each division bearing a many-flowered umbel. June. *l.* radical, the divisions pinnately five foliate; leaflets oblong-oval, with a long tapering point, serrate. Root horizontal, very long. *h.* 3ft. to 4ft. North America, 1731. Quite hardy, herbaceous perennial.

A. Osyana (Osyan).* Resembling *A. leptophylla*, but with leaflets deeply bifid at the ends; surface colour bright green; primary veins and tips of the leaflets chocolate brown. South Sea Islands, 1870. Very elegant stove species.

A. pentaphylla (five-leaved).* *l.* digitate, or sometimes only three leaflets are produced, each varying from 6in. to 10in. in length, and from 1in. to 2in. in breadth, deeply lobed or pinnatifid, bright shining

green. Stem arboreous, prickly. *h.* 20ft. Japan. SYN. *Panax spinosa*.

A. p. variegata (variegated). *l.* broadly edged with creamy white. Japan, 1874.

A. quercifolia (oak-leaved).* *l.* opposite, trifoliate; leaflets deeply sinuate; lower petioles about 3in. long, light shining green. New Britain, 1880. Very pretty stove species.

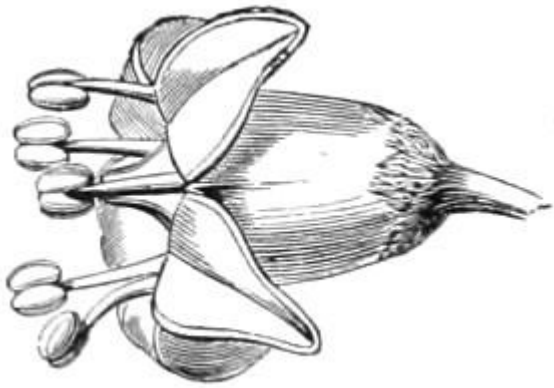


FIG. 142. FLOWER OF ARALIA RACEMOSA, enlarged.

A. racemosa (raceme-flowering).* *fl.* greenish-white, petals spreading; peduncles axillary, disposed in a terminal raceme, umbelliferous. June. *l.* petioles tripartite, the partitions bearing each three to five ovate or cordate, acuminated, serrated, smoothish leaflets. *h.* 3ft. to 4ft. North America, 1658. Hardy herbaceous species, highly

ornamental. See Fig. 142.

A. reticulata (netted). *l.* alternate, strap-shaped when young, becoming larger with age, dark green, reticulated with a lighter shade of the same colour. A very handsome species, requiring stove heat during winter. In spring and summer it is admirably suited for conservatory or indoor decoration, having a light and graceful aspect.

A. rotunda (round). *l.* sometimes of a single leaflet only, which is spreading, orbicular, cordate at the base, margined with distinct white tipped teeth; at other times, especially when approaching maturity, the leaves are trifoliate, the leaflets being rounded and toothed, and the terminal one being about double the size of the lateral ones. Stems erect, brownish-green, spotted when young with pale elongate blotches. Polynesia, 1882.

A. Scheffleri (Scheffler's). *l.* on long petioles, digitate; leaflets five, petiolulate, lanceolate, attenuated at the base, serrulated, glabrous on both surfaces. Stem shrubby, smooth. New Zealand. Greenhouse species.

A. spectabilis (showy). A synonym of *A. concinna*.

A. spinosa (thorny).* Angelica Tree.

l. doubly and triply pinnate; leaflets ovate, acuminated, deeply serrated. Stem simple, prickly (as are also the petioles), forming into an umbrella-like head, deciduous. *h.* 8ft. to 12ft. North America, 1688. A very fine hardy species for sheltered spots.

A. spinulosa (small-spined). *l.* alternate, pinnate; pinnæ ovate acuminate, dark green, margined with little reddish-crimson spines or prickles. Stems and petioles spotted and suffused with crimson. 1880. A bold and robust stove plant.

A. ternata (three-leafleted).* *l.* opposite, ternate; leaflets oblong-lanceolate; margins in some cases deeply serrate, in others sinuate, light green. New Britain, 1879. A slender growing species.

A. trifolia (three-leaved). A synonym of *Pseudopanax Lessonii*.

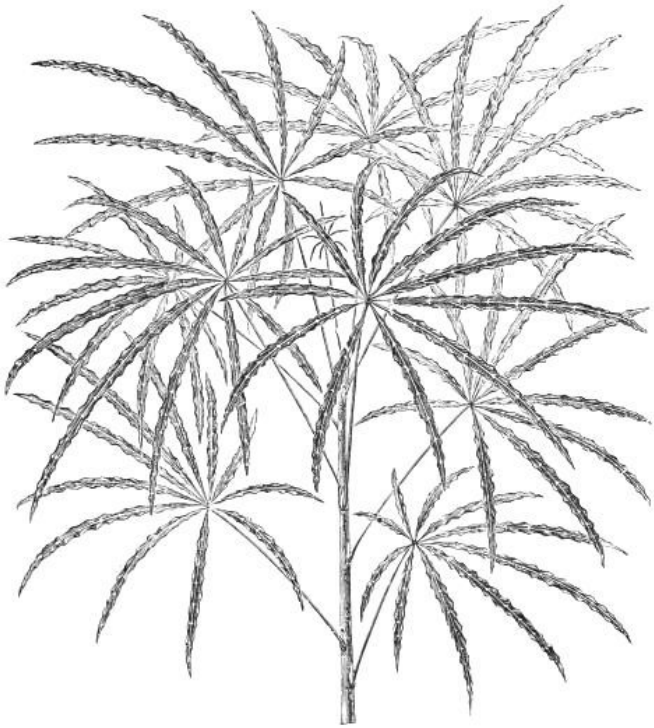


FIG. 143. ARALIA VEITCHII.

A. Veitchii (Veitch's).* *l.* digitate, with about eleven filiform undulated leaflets, glossy green above, dark red beneath; petioles long and slender. New Caledonia, 1867. A very handsome (said to be the best) species, with slender, erect growing stem. See Fig. 143, for which we are indebted to Messrs. Veitch and Sons.

A. V. gracillima (most graceful).* *l.* alternate, spreading; leaflets nearly linear, but slightly narrowed at both ends, having a prominent ivory-

white central rib. South Sea Islands, 1876. An erect growing species, with an elegantly graceful habit. It is allied to *A. reticulata*, but is more handsome. This charming variety is undoubtedly the finest for table decoration, and is frequently grafted upon stocks of the typical form. It enjoys plenty of heat. SYN. *A. gracillima*.

ARALIACEÆ. An order of trees, shrubs, or (rarely) herbaceous plants, often pubescent, and sometimes spiny. Flowers variously disposed, hermaphrodite or unisexual, regular; petals usually five, and valvate. Leaves alternate, or (rarely) opposite. This order is closely allied to *Umbelliferæ*; and the best known genera are *Aralia* and *Hedera*.

ARAR-TREE. A common name for **Callitris quadrivalvis** (which *see*).

ARAUCARIA (from *Araucanos*, its name in Chili). SYN. *Eutacta*. ORD. *Coniferæ*. A noble genus of diœcious or sub-diœcious evergreen trees, with usually imbricated persistent flat sessile scale-like leaves. Male cones large, cylindrical, terminal; female ones very large, globular, terminal, with dense ligneous deciduous scales, each bearing a solitary seed. The majority of the species are not, unfortunately, sufficiently hardy to withstand our winters out of doors. Few trees can compete with them in symmetry and elegant proportion for conservatory decoration, where they may be grown in large tubs, or planted out. Small plants grown in pots are most serviceable for table and other decorative purposes. They thrive in a good fibrous loam, mixed with leaf soil and sand. Propagation by

means of seed is the surest and most satisfactory method; the seed should be sown in pans or boxes, or if in large quantities, in a bed, with but gentle heat; they usually take some time to germinate. Cuttings are procured by taking off the leading shoots, and fixing them firmly in a pot of sand; they first require a cool place, but may afterwards be subjected to slight warmth. When rooted, they should be potted off into the soil above mentioned. The young growths which afterwards shoot from the plant, whence the cutting, may be taken off and treated in much the same manner. These are the only methods of propagation worth pursuing.

A. Balansæ (Balansa's). *male cones* cylindrical-conical, 2in. *female cones* elliptic globose, 4in.; scales obovate, cuneate. *l.* arcuately-uncinate, ovate triangular, imbricated round the distichous, simple branchlets. *h.* 130ft. to 160ft. New Caledonia, 1875. A fine greenhouse plumosely branched tree.

A. Bidwillii (Bidwill's).* Bunya-Bunya Pine; Moreton Bay Pine. *cones* sub-globose, longest diameter 10in. to 12in., shortest 9in. to 10in. *l.* ovate-lanceolate, in two nearly horizontal rows, acuminated, slightly convex above, concave beneath, leathery, deep shining green. *h.* 150ft. Moreton Bay. Habit very regular and symmetrical. Greenhouse species.

A. brasiliensis (Brazilian). *l.* oblong-lanceolate, much attenuated at the

point, loosely imbricated, deep green; lower part of the trunk usually free from branches, terminating in a rounded head. *h.* 70ft. to 100ft. Brazil, 1819. *A. b. gracilis*, and *A. b. Ridolfiana* are two forms of this species.

A. columnaris (columnar). A synonym of *A. Cookii*.

A. Cookii (Cook's).* *l.* awl-shaped, short, densely imbricated around the frondose branches. Described by Mr. Abbay as having "a somewhat curious habit, even when growing alone, of shedding their branches for five-sixths or more of their height, and then replacing them by a smaller and more bushy growth, so that the tree at a distance presents a very columnar appearance, the resemblance being increased by the summit being crowned with a mass of foliage somewhat like a capital." *h.* 200ft. New Caledonia, 1851. SYN. *A. columnaris*.



Fig. 144. Araucaria excelsa.

A. Cunninghami (Cunningham's).* *l.* on the sterile branches needle-shaped, obscurely quadrangular, rigid, acute; on the fertile branches shorter, stouter, closely appressed, bright green; upper branches ascending, lower ones horizontal. *h.* 100ft. Moreton Bay. This fine species we have found to be quite hardy on the south-west coast of England.

A. C. glauca (milky-green). A very

handsome variety, with silvery glaucous leaves.

A. excelsa (lofty).* The Norfolk Island Pine. *l.* awl-shaped, curved, sharply acuminated, bright green, densely packed on the frondose, deltoid, horizontal, or pendulous branches. When well grown, this is a beautifully symmetrical greenhouse or conservatory species, attaining to a height of 150ft., and a circumference of 20ft. or more. Norfolk Island. This is especially desirable in a small state. There are several varieties known, the best being: *A. e. glauca*, having lighter green, and very glaucous foliage; and *A. e. robusta*, which is larger in all its parts. See Fig. 144.

A. Goldieana (Goldie's).* Allied to *A. Rulei*. *l.* produced in whorls, pendulous, dark green, varying in size. New Caledonia. Most distinct and elegant for conservatory decoration.

A. imbricata (imbricated).* The Monkey Puzzle. *fl.*, male and female catkins on separate trees; the males are six or seven in a cluster, pedunculate, yellow, and oval with numerous scales, imbricated, long, and recurved at the points; the female catkins are oval, with numerous wedge-shaped scales, with narrow oblong brittle points; they

are produced at the ends of the branches. *cones*, when fully ripe globular, from 3in. to 4in. in diameter, dark brown. The branches are horizontal, inflexed, and ascending at the extremities, and are produced in whorls. *l.* ovate-lanceolate, sessile, thickened at the base, stiff, leathery, straight, somewhat keeled-shaped below, and strongly mucronate at the apex; verticillate, with seven or eight in a whorl, imbricate, and closely encircling the branches, concave, glabrous, shining, marked with longitudinal lines, dotted on both sides. *h.* 50ft. to 100ft. Chili, 1796. A well known hardy tree, of striking aspect, and indispensable to Arboreta and shrubberies. See Fig. 145.

A. Rulei (Rule's).* *male cones* oblong obtuse; *female cones* oval. *l.* oblong-lanceolate, with a prominent dorsal nerve, more closely appressed, and less sharply pointed than in the foregoing species; imbricated in four rows. Branches horizontal; branchlets often quite pendulous. *h.* 50ft. Papuan Archipelago.

A. R. elegans (elegant).* *l.* smaller; whorls of branches closer together; branchlets more slender. An elegant form; and, from its comparative dwarf and graceful habit, should be

very generally grown.

ARBOR. A tree. A perennial plant, having a distinct bole or trunk, from which the main branches grow.

ARBORESCENT. Having a tendency to become a tree.

ARBORETUM. A collection of hardy trees formed for pleasure or instruction, and which, when well managed, is a source of much interesting study. They afford shelter, improve the local climate, renovate bad soils, &c., and also, by concealing or hiding disagreeable objects, heighten the effect of agreeable ones, create beauty, and add value. A properly arranged Arboretum should be constructed with a view to picturesque beauty, and not systematically, as is usually the case in Botanic Gardens, although scientific purposes are best served by a systematic arrangement.

ARBOR-VITÆ. *See* **Thuja**.

ARBOUR. A seat surrounded by lattice work, covered by Vines, Wistarias, or other climbing plants.

ARBUTUS (from *arboise*, Celtic for austere bush; in allusion to the austere quality of the fruit). Strawberry Tree. ORD. *Ericaceæ*. Trees and shrubs, with evergreen alternate laurel-like leaves. Corolla globose, or ovately campanulate; petals five, reflexed. Very ornamental subjects for lawns and shrubberies, thriving well in a light sandy or peaty soil. They may be propagated by seeds, which should be sown in sand during March; by budding, and by inarching; the first mentioned method is the one most generally employed, with good results. The various sorts may be grafted, budded, or inarched upon *A. Unedo*. The greenhouse species are rare in

cultivation, but their management does not materially differ from other plants requiring a similar temperature.

A. Andrachne (Andrachne).* *fl.* greenish-white; panicles terminal, erect, clothed with viscid down. March and April. *l.* oblong, bluntish, entire in some, a little serrated in others, glabrous. *h.* 10ft. to 14ft. Greece, 1724. A fine ornamental tree.

A. A. serratifolia (saw-edge-leaved). *fl.* yellowish, disposed in rather large terminal clusters. *l.* serrated, and narrower than those of the species. SYN. *A. serratifolia*.

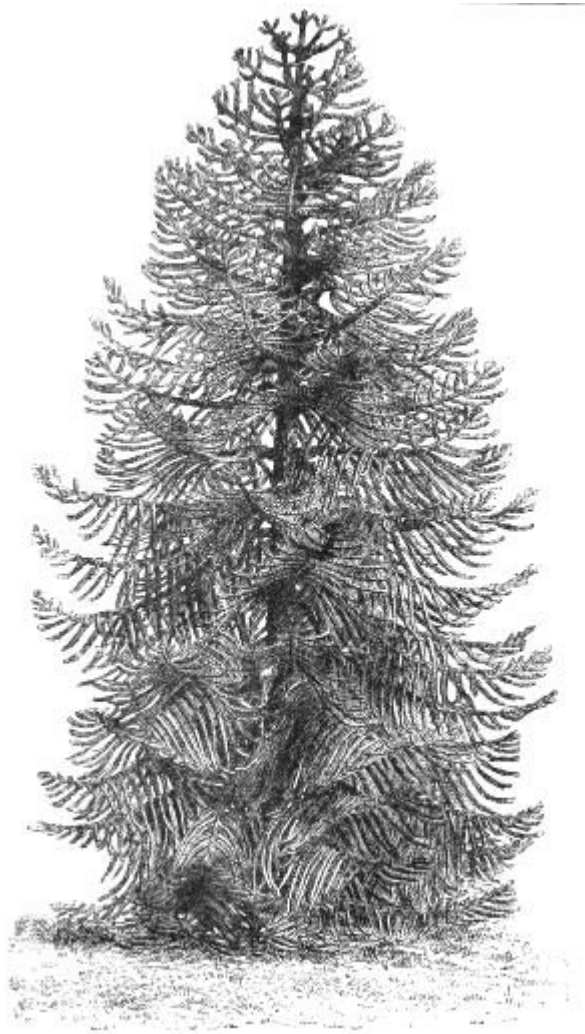


Fig. 145. ARAUCARIA IMBRICATA.

A. andrachnoides (Andrachne-like). A synonym of *A. hybrida*.

A. canariensis (Canary). *fl.* greenish-white; panicles erect,

hispid. May. *l.* oblong-lanceolate, serrated, glaucous beneath. *h.* 8ft. to 10ft. Canary Islands, 1796. Greenhouse.

A. densiflora (thickly-flowered).* *fl.* white; corolla oval; pedicels furnished with three bracteas at the base; panicle terminal, composed of closely packed racemes. *l.* 4in. to 5in. long, on long petioles, oblong, acute, sharply toothed, coriaceous, glabrous above and shining, but downy beneath, the middle nerve with rusty villi; branches angular, hairy. *h.* 20ft. Mexico, 1826. Greenhouse.

A. hybrida (hybrid).* *fl.* white; panicle terminal, pendulous, downy. September to December. *l.* oblong, acute, serrated, glabrous; branches pilose. *h.* 10ft. to 0ft. A half-hardy garden hybrid; it originated about 1800. SYN. *A. andrachnoides*.

A. Menziesi (Menzies').* *fl.* white; racemes axillary and terminal, panicled, dense-flowered. September. *l.* broad-oval, quite entire, glabrous, on long petioles. *h.* 6ft. to 10ft. North-west America, 1827. A noble hardy tree. *A. laurifolia* comes close to this species. SYN. *A. procera*.

A. mollis (soft). *fl.* rosy, drooping; panicle terminal, crowded, racemose. June. *l.* oblong-acute,

sharply toothed, coriaceous, clothed with soft pubescence above, and white tomentum beneath. *h.* 6ft. Mexico. Greenhouse shrub.

A. mucronata (mucronate). A synonym of *Pernettya mucronata*.

A. pilosa (pilose). A synonym of *Pernettya pilosa*.

A. procera (tall).* A synonym of *A. Menziesi*.

A. serratifolia (saw-edge-leaved). A synonym of *A. Andrachne serratifolia*.

A. Unedo (Unedo).* The Strawberry Tree. *fl.* white, deep red in some of the varieties, nodding, in terminal racemose, bracteate panicles. September. *fr.* large, scarlet, nearly globose, granular, edible. *l.* oblong-lanceolate, glabrous, serrulated; branchlets clothed with glandular hairs. *h.* 8ft. to 10ft. West of Ireland, and South Europe. There are several varieties of this plant in cultivation. It is one of the greatest ornaments in the months of October and November—the season when it is in flower, and when, also, the fruit of the former year is ripe.

A. Xalapensis (Xalapan). *fl.* reddish white; corolla ovate; panicle terminal, composed of many racemes. April. *l.* petiolate, oblong, acute, quite entire, about 2in. long, glabrous above, but clothed with

brownish tomentum beneath; epidermis separating, brownish purple. Young branches glabrous, but beset with ramentæ. *h.* 6ft. to 9ft. Mexico. Greenhouse species.

ARCHEGONIUM. The female organ in ferns, &c., analogous with the ovary in flowering plants.

ARCTOSTAPHYLOS (from *arktos*, a bear, and *staphyle*, a grape; bears eat the fruit of some species). ORD. *Ericaceæ*. Handsome hardy or half-hardy shrubs or sub-shrubs, agreeing in generic characters with *Arbutus*, except that the fruit is five-celled and the cells one-seeded, and not granular on the outside. For culture, &c., *see* **Arbutus**.

A. alpina (alpine).* Black Bearberry. *fl.* white or flesh-coloured, in terminal, reflexed racemes; pedicels rather hairy. April. *l.* obovate, acute, wrinkled, serrated, deciduous. Stems procumbent, trailing. Scotland (but rare), &c. SYN. *Arbutus alpina*.

A. nitida (shining).* *fl.* white; racemes terminal. May. *l.* oblong-lanceolate, acute, smooth on both sides and shining above. *h.* 4ft. Mexico, 1839. An erect half-hardy evergreen.

A. pungens (stinging).* *fl.* white; pedicels close; racemes short, at first terminal, but at length lateral. February. *l.* ovate-oblong, acute, mucronate, rather pungent, quite entire, coriaceous, clothed with fine

down on both surfaces; branchlets angular, downy. *h.* 1ft. Mexico, 1839. A dwarf, much branched, half-hardy evergreen shrub.

A. tomentosa (tomentose).* *fl.* pure white, campanulately urceolate, bracteate; peduncles axillary, shorter than the leaves, somewhat capitately racemose. December. *l.* oval, acute, sub-cordate at the base, clothed with white tomentum beneath, on short petioles; branches hispid. *h.* 4ft. North-west America, 1826. Shrubby species; hardy.

A. Uva-ursi.* Bearberry. *fl.* flesh-coloured, with a red mouth, growing in small clusters at the extremities of the branches. April. *l.* obovate, quite entire, coriaceous, shining. Highlands of Scotland and Wales. A hardy evergreen procumbent trailer. SYN. *Arbutus Uva-ursi*.

ARCTOTHECA (from *arktos*, a bear, and *theke*, a capsule; so named from the roughness of the fruit). ORD. *Compositæ*. Greenhouse herbaceous perennial, allied to *Arctotis*. Heads radiate; involucral scales imbricate in many rows, the outer linear, herbaceous, inner larger, scariose, very obtuse; receptacle honeycombed, bearing many little fringes; achenes ovate, somewhat four-sided, without wings or pappus. It thrives in a compost of peat, leaf soil, and loam. Propagated by divisions of the plant, or cuttings, in spring. Several species formerly classed in this genus are now included under *Arctotis*.

A. repens (creeping). *fl.-heads* yellow. July. *l.* petioled, lyrate-pinnatifid, green and mostly smooth above, white-woolly beneath. Cape of Good Hope, 1793. A stemless, creeping or decumbent herb.

ARCTOTIS (from *arktos*, a bear, and *ous*, an ear; in reference to the shaggy fruit). ORD. *Compositæ*. Mostly half-hardy herbaceous perennials. Involucral bracts numerous, imbricated, scariose on the margin; receptacle pitted, studded with bristles between the florets; achenes grooved, crowned with a pappus of membranous scales. The species of this genus are of easy culture in a compost of loam and leaf soil. Propagated by cuttings at any time of the year; these should be pricked in pots of very sandy soil, and placed in gentle warmth; they must be kept uncovered and moderately dry, or they will rot. The Arctotis are very handsome plants in sunny, dry positions outside during the summer months, but they must be protected during winter.

A. acaulis (stemless).* *fl.-heads* yellow and red. Summer. *l.* hoary on each side, ternate, lyrate. Stem very short, decumbent. *h.* 4in. Cape of Good Hope, 1759. Very rarely met with.

A. arborescens (tree-like).* *fl.-heads*, ray-florets white above, pink beneath; disk-florets yellow; disposed in large circular Daisy-like heads. Summer. *l.* linear-oblong, pinnate; upper ones amplexicaul; lower ones stalked. *h.* 2ft. Cape of

Good Hope, 1815.

A. argentea (silvery). *fl.-heads* orange. August. *l.* lanceolate-linear, entire, downy. *h.* 1ft. Cape of Good Hope, 1774.

A. aureola (golden). Synonymous with *A. grandiflora*.

A. breviscapa (short-stalked). Synonymous with *A. speciosa*.

A. grandiflora (large-flowered).* *fl.-heads* orange; outer scales of involucre reflexed, cuneate, oblong, with a broad short point, somewhat cobwebbed. July. *l.* pinnatifid, serrulate, three-nerved. *h.* 1½ft. Cape of Good Hope, 1710. SYNS. *A. aureola* and *A. undulata*.

A. reptans (creeping). *fl.-heads* white, orange. July. *l.* hairy beneath; lower lyrate toothed; upper lanceolate toothed. Stem ascending. *h.* 8in. Cape of Good Hope, 1795.

A. rosea (rosy). *fl.-heads* pink. Autumn. *l.* spathulate-lanceolate, repand-toothed, hoary. Stem procumbent. Cape of Good Hope, 1793.

A. speciosa (showy).* *fl.-heads* yellow; outer scales of involucre linear recurved. July. *l.* lyrate, pinnatifid, hoary beneath, three-nerved. Plant stemless. *h.* 1½ft. Cape of Good Hope, 1812. Closely allied

to *A. acaulis*. SYN. *A. breviscapa*.

A. undulata (wavy). Synonymous with *A. grandiflora*.

ARCUATE, ARCUATED. Curved or bent like a bow; forming an arch.

ARDISIA. (from *ardis*, a point; in reference to the acute, spear-pointed anthers). SYN. *Pyrgus*. ORD. *Myrsineæ*. An extensive genus of greenhouse or stove, mostly ornamental, evergreen trees and shrubs. Flowers white or rose-coloured, more or less panicled; panicles sometimes many-flowered at the extremities of the branches, and longer than the leaves, sometimes few-flowered and in the axils of the leaves. Leaves alternate, rarely almost opposite, or three in a whorl, dotted. Propagated by cuttings of the half-ripened wood taken from the side shoots of the plant any time from March to September; but, as the points of these side shoots bear the blossoms and fruit, they are not well adapted for making good plants. To obtain the best plants, the largest, ripest, and best-coloured berries should be sown early in spring, as soon as gathered, in a wide-mouthed pot or seed pan, well drained and filled with loam and peat in equal parts, with the addition of some sand, and plunged in bottom heat, the soil being kept moderately moist. The seeds will germinate in a few weeks after sowing, and when about 2in. high, the strongest seedlings should be selected and placed in 3in. pots, the same mixture of soil being used, with the addition of a fourth part well decomposed manure. After potting, the plants must be moistened overhead twice a day with a fine rose or syringe, and be kept in a close atmosphere until the roots have taken to the fresh soil. When the plants begin to grow again, they should be removed to a light

situation in the house; and when the pots are well filled with roots, a shift into 6in. pots may be effected, water being given judiciously until well established, and here they may remain to fruit. Until the berries are coloured, clear manure water, given once or twice a week, will be found beneficial. The plants arrive at their best when about 18in. or 2ft. high; after that, they begin to get naked at the bottom. It will then be wise to cut the worst plants down to within 2in. of the pots, in early spring, allowing them to become dry at the roots before this operation is performed. By giving moisture to the roots when the cut has become dry, the plants will soon break into growth again, when some of the worst placed shoots should be rubbed off, leaving only one or two of the strongest and best placed, calculated to develop into a well formed plant. When the shoots have grown 2in. or 3in., the plants should be turned out of their pots, the soil shaken out from the roots, and the long ends of the roots trimmed in a little with a knife; they must then be placed in a pot sufficiently large to hold the roots without squeezing. The plants should now occupy the warmest end of the house in which they are grown, care being taken in watering until new roots are formed, when they may have more air and somewhat liberal supplies of water. As soon as they are sufficiently advanced in growth, they should be transferred to a larger-sized pot. With proper treatment, they will flower and fruit the same season as they are cut down, and form handsome plants. Although most species of this genus are classed as stove plants, they will succeed very well in a temperature that does not fall below 45deg. in winter; and, when so grown, they are not so liable to become infested with large brown scale and other insect pests. This is particularly the case

with *A. crenulata*, and cool treatment is also favourable to the ripe berries hanging on the plants for a much longer time than when grown in a stove. Moreover, they do not suffer so much when removed for decorative purposes.

A. acuminata (taper-pointed). *fl.* nearly white; petals small, acute, dotted; panicles terminal and axillary, many-flowered. July. *l.* entire, glabrous, oblong, acuminated, attenuated at the base. *h.* 6ft. to 8ft. Guiana, 1803.

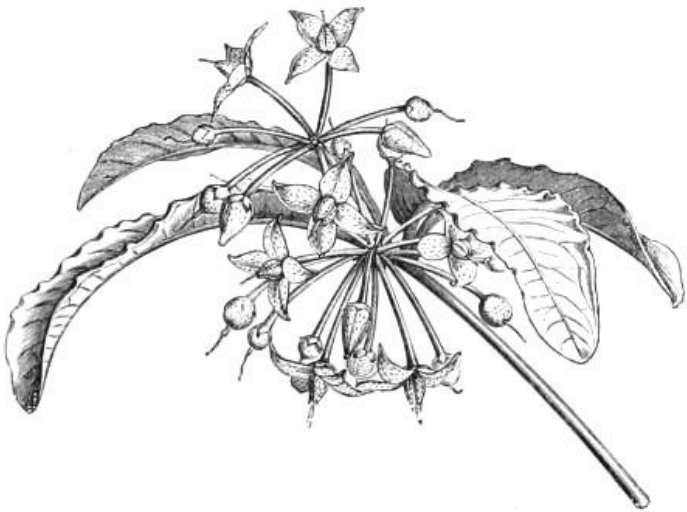


FIG. 146. FLOWERING BRANCH OF ARDISIA CRENULATA.

A. crenulata (round-notched-leaved).* *fl.* reddish violet; panicles terminal; pedicels umbellate. June. Berries numerous, bright coral-like. *l.* lanceolate-ovate, tapering at both ends, repandly crenulated, pilose. *h.*

3ft. to 6ft. Mexico, 1809. When grown in a cool atmosphere, as previously alluded to, it is quite common for one crop of berries to hang on the plants until another crop is ripe. This is a splendid plant, superior even to the red-berried Solanums for decorative purposes, for which it is largely grown. See Fig. 146.

A. crispa (curled). *fl.* small, drooping, red; cymes terminal, usually solitary, often compound; pedicels smooth, finely veined, umbellate, drooping. July. Berries red, size of peas. *l.* bluntish, oblong-lanceolate, attenuated at both ends, with repandly crenulated glandular edges, glabrous. *h.* 4ft. India, 1809.

A. humilis (humble). *fl.* rose-coloured; peduncles solitary, bearing each a simple racemose umbel of many pretty, large, drooping flowers; petals lanceolate, first recurved, afterwards revolute. June. Berries size of peas, shining, black, juicy. *l.* oblong-lanceolate, acuminated at both ends, glabrous, veined, shining. *h.* 4ft. India, 1820.

A. japonica (Japanese).* *fl.* white; pedicels red, sub-umbellate, secund, drooping; racemes simple, axillary. June. *l.* nearly opposite, or three to five in a whorl, on short petioles, cuneate-oblong, acute, glabrous,

serrated; 4in. long. *h.* 1ft. Japan. Perhaps the hardiest of all the species.

A. macrocarpa (large-fruited).* *fl.* flesh-coloured, dotted; petals ovate, obtuse; racemes terminal, corymbose, almost sessile, slightly hairy. Berries vermilion coloured, as large as gooseberries. *l.* oblong, acute, tapering downwards, glandularly crenated, dotted, close together, leathery, 6in. to 8in. long, paler beneath, veinless. *h.* 5ft. to 6ft. Nepaul, 1824. A beautiful shrub.

A. Oliveri (Oliver's).* *fl.* rose pink, white eye: corolla rotate, ½in. across; lobes obtuse; heads terminal, consisting of a number of stalked, many-flowered corymbs; pedicels about twice as long as the flower. July. *l.* nearly sessile, entire, glabrous, 6in. to 8in. long, by 2in. in the broadest portion; oblanceolate, acuminate, tapering towards the base. Costa Rica, 1876.

A. paniculata (panicled).* *fl.* rose-coloured; panicles terminal, composed of many alternate compound branches, large and elegant; petals and sepals ovate. July. Berries red, smooth, size of a pea, juicy. *l.* glabrous, cuneate-oblong, almost sessile, reflexed, 6in. to 20in. long, and from 3in. to 5in. broad, crowded at the ends of the

branches. *h.* 8ft. to 10ft. India, 1818.

A. punctata (dotted). *fl.* greyish white, sub-campanulate, secund, beset with dark dots, and the pedicels with dark lines; peduncles umbellate, terminal, and axillary; umbels involucrated by deciduous bracts. June. *l.* glabrous, lanceolate, leathery, repandly crenated, tapering to the base. *h.* 6ft. to 10ft. China, 1822.

A. serrulata (finely serrated).* *fl.* deep red; petals ciliated; calyces and pedicels coloured; panicles terminal; pedicels umbellate. July. *l.* glabrous, lanceolate, acuminated, wrinkled, serrulated, beset with rusty dots beneath; branches downy. *h.* 2ft. to 3ft. China, 1820.

A. villosa (hairy). *fl.* whitish, umbels axillary and terminal, very villous. October. Berries villous. *l.* lanceolate, acuminated, villous beneath, crenulated, 5in. to 7in. long, tapering to the base, copiously dotted. China. All the upper parts of the plant are densely beset with hairs.

A. v. mollis (soft).* This variety has very fine red berries, and is superior to the type.

A. Wallichii (Wallich's). *fl.* red, in loose racemes; peduncles axillary, one-half shorter than the leaves, and

are, as well as the pedicels, pilose. July. *l.* obovate, acute, or obtuse, narrowed into the marginate petioles, repandly crenulated, 4in. to 5in. long, and 2in. broad, thickish. *h.* 2ft. India.

ARDUINA (in honour of P. Arduini, curator of the Economical Garden of Padua, in the time of Linnæus). ORD. *Apocynaceæ*. A singular and pretty greenhouse evergreen shrub, of easy culture in carefully drained pots of peat and loam, mixed in equal proportions. Propagated by cuttings in sand, under a glass. The winter temperature should not be allowed to fall below 40deg.

A. bispinosa (two-spined). *fl.* small, white, sweet-scented, terminal, corymbose. March to August. Berry red. *l.* cordate-ovate, mucronate, nearly sessile, dark green, larger than those of Box. Spines twin, simple, but usually bifid; in this last case, one of the clefts points downwards, and the other upwards. *h.* 3ft. to 5ft. Cape of Good Hope, 1760. SYN. *Carissa Arduina*.

ARECA (*Areec* is its name in Malabar, when an old tree). The Cabbage Palm. ORD. *Palmeæ*. This genus is now broken up into several, and many species formerly here arranged are now found under *Acanthophœnix*, *Euterpe*, *Hyophorbe*, *Kentia*, *Oncosperma*, *Phœnicophorum*. Very ornamental and graceful stove palms, with a branching spadix, and double spathe, which incloses the flowers. Flowers unisexual, borne upon the same spike; female flowers

having six rudimentary stamens, and male flowers a six-cleft perianth. Fruit one-seeded. They thrive in a compost of loam, peat, and leaf soil, in equal parts, with a liberal addition of sand; but when they are fully grown, loam should preponderate to the extent of about two-thirds, and some rotten cow-manure may be added. Propagated from seeds, which should be sown in a compost similar to above, and placed in a moist gentle heat. They are employed, when young, with much success for the decoration of drawing rooms and dinner tables.

A. Aliciæ (Princess Alice's). *l.* pinnatisect; segments sessile. North Australia. A very handsome species, with a comparatively dwarf habit; it is a valuable decorative plant.

A. Catechu (Catechu). *l.* pinnate, from 3ft. to 6ft. long; leaflets 12in. to 24in. in length, and about 2in. broad, light green; petioles broadly sheathed at the base. *h.* 30ft. India, 1690. One of the best and oldest species in cultivation, very effective, in a young state, for dinner table decoration. It produces the Betel nut, of which enormous quantities are used in India.

A. concinna (neat). *l.* pinnatisect, sub-glabrous; segments sickle-shaped, much acuminated. Stem green, 8ft. to 12ft. high, 1in. to 2in. in diameter. Ceylon. The Cingalese chew the albumen of the seeds with their Betel.

A. gigantea (gigantic). A synonym of *Pinanga ternatensis*.

A. glandiformis (gland-formed). *l.* pinnatisect, 9ft. to 12ft. long when fully grown. *h.* 30ft. Moluccas. A handsome stove palm, of bold aspect, and very suitable, when young, for decorative purposes.

A. Normanbyi (Normanby's). A synonym of *Ptychosperma Normanbyi*.

A. triandra (three-stamened). *l.* pinnate, like those of *A. Catechu* in size, &c. *h.* 20ft. India, introduced to Britain about 1810.

ARENARIA (from *arena*, sand; in which most of the species are found). Sandwort. ORD. *Caryophyllaceæ*. TRIBE *Alsineæ*. A very large genus of hardy herbaceous plants, consisting of about 150 species. It is distinguished by having generally three styles. The perennials only are worth growing; these are extremely pretty little alpine plants, and will thrive in any ordinary soil in exposed places; the rarer species may be grown in small pots, well drained, in a mixture of sand, loam, and leaf soil, or in well-drained crannies of the rockery. They may be increased by either division, seeds, or cuttings; the latter, placed under a hand-glass, will root freely. The best time to divide the plants is early spring, or July and August. Seeds should be sown in spring in a cold frame.

A. balearica (Balearic).* *fl.* white, sepals erect; peduncles elongated, one-flowered. March to August. *l.*

very small, ovate, shining, rather fleshy, ciliated. *h.* 3in. Corsica, 1787. A pretty little creeper, one of the best plants for covering damp borders of the rockwork.

A. cæspitosa (tufted). Synonymous with *A. verna cæspitosa*.

A. ciliata (ciliated). *fl.* white, usually solitary; sepals ovate, acute, five to seven ribbed; petals obovate, twice as long as the sepals. July. *l.* ovate, or obovate, roughish, with a few hairs, one-nerved, and ciliated. Ireland. *h.* 6in. A thick, tufted, spreading, procumbent plant.

A. graminifolia (grass-leaved).* *fl.* white; panicle three-forked, hairy, loose; sepals very blunt, much shorter than the obovate petals. June. *l.* long, awl-shaped, filiform, scabrous on the margins from serratures. Stem erect, simple. *h.* 6in. to 9in. Caucasus, 1817.

A. grandiflora (large-flowered).* *fl.* white, usually solitary; peduncles very long, pubescent; sepals ovate, awned, three-nerved, smaller than the petals. June. *l.* awl-shaped, broadish, flat, three-nerved, ciliated, radical ones crowded. *h.* 3in. to 6in. France, 1783. *A. g. biflora* is a two-flowered, and *A. g. triflora* a three-flowered, variety.

A. laricifolia (Larch-leaved).* *fl.*

white; sepals bluntish, triple nerved, hairy; petals twice as long as the sepals; stems ascending, one, three, or six flowered, somewhat scabrous; calyx cylindrical. June. *l.* awl-shaped, denticulately ciliated. *h.* 6in. Switzerland, 1816.

A. longifolia (long-leaved). *fl.* white; sepals ovate, obtuse, not half the length of the obovate petals; panicle three-forked, glabrous, crowded. June. *l.* awl-shaped, filiform, serrulated. Stem erect, simple. *h.* 6in. to 9in. Siberia, 1823.

A. montana (mountain). *fl.* large, white; peduncles terminal, very long, one-flowered; sepals lanceolate, acuminated, much shorter than the corolla. April. *l.* lanceolate-linear; sterile stems very long, procumbent. *h.* 3in. France and Spain, 1800.

A. peploides (Peplis-like). *fl.* white; sepals ovate, shorter than the oblong petals. May to July. *l.* ovate, light green, rather fleshy; branches procumbent, fleshy, deciduous. *h.* 3in. to 4in. Sea shores of Britain. SYN. *Honckenya peploides*.

A. purpurascens (purplish).* *fl.* purplish; pedicels tomentose, scarcely exceeding the leaves; sepals lanceolate, smooth, with shrivelled margins, longer than the corolla; branches two to three-flowered.

May. *l.* ovate-lanceolate, acuminated, glabrous. Plant tufted, decumbent. *h.* 6in. Higher Pyrenees.

A. rotundifolia (round-leaved).* *fl.* white, solitary; petals roundish-ovate, longer than the sepals. July and August. *l.* about ¼in. across, roundish, ciliated, on spreading tufted branches. *h.* 4in. to 6in. Siberia.

A. tetraquetra (four-angled). *fl.* white, somewhat capitate; sepals stiff, acute, keeled, ciliated, almost equal in length to the corolla. August. *l.* ovate, keeled, recurved, edged, imbricated in four rows. Stem straight, pubescent. *h.* 3in. to 6in. France, 1731.

A. verna (spring-flowering). *fl.* small, white; sepals ovate, lanceolate, acuminated, with three remote equal ribs, longer than the obovate petals. May. *l.* awl-shaped, bluntish. Stems panicled, elongated. *h.* about 3in.

A. v. cæspitosa (turfy). A variety having very leafy stems. Calyces and peduncles smoothish. Europe. SYN. *A. cæspitosa*.

ARENGA (name of doubtful origin). SYN. *Saguerus*. ORD. *Palmæ*. An extremely useful and interesting palm. The medulla of the trunk is used as sago, and the saccharine juice forms excellent sugar. It requires a strong heat and rich mould. Propagated by seeds

only.

A. saccharifera (sugar-bearing). *fl.* striped. June. *h.* 40ft. Moluccas, 1829.

AREOLATE. Divided into distinct angular spaces, or areolæ.

ARETHUSA (mythological: named after a nymph of Diana's, who was changed into a fountain; in allusion to the habit of the plants). ORD. *Orchideæ*. A small genus of very pretty, but rare, terrestrial orchids. They require a moist shady spot with a northern aspect, and thrive best in a compost of well-rotted manure and sphagnum. A mulching in winter, by way of protection, is needed.

A. bulbosa (bulbous).* *fl.* large, bright rose purple, solitary, sweet-scented, terminal; lip dilated, recurved, spreading towards the summit, bearded-crested down the face; scape one-leaved. May. *l.* linear, nerved. *h.* 8in. Carolina.

ARETIA. *See* **Androsace**.

ARGANIA (from *argam*, its aboriginal name). ORD. *Sapotaceæ*. A very fine greenhouse evergreen tree, said by Don to flourish against a south wall, out of doors, with the protection of a mat in severe weather. It will thrive in ordinary garden soil. Increased by layers and cuttings in autumn and spring, the latter requiring a bell glass covering; both operations must be performed in a moderately heated greenhouse.

A. Sideroxylon (Iron-wood). *fl.*, corolla greenish yellow, cup-shaped, five-parted, with ovate-lanceolate, sub-emarginate segments; lateral and axillary, scattered, crowded, sessile. *fr.* dotted with white, size of a plum, full of white, milky juice. July. *l.* lanceolate, entire, bluntish, glabrous, paler beneath; branches terminated by strong spines. *h.* 15ft. to 20ft. Morocco, 1711. As the specific name implies, the wood is excessively close and hard, so much so that it sinks in water. SYNS. *Elæodendron Argan*, *Sideroxylon spinosum*.

ARGEMONE (from *argema*, cataract of the eye; in allusion to some real or fancied medicinal properties). ORD. *Papaveraceæ*. Very handsome annuals and perennials, abounding with yellow juice, and covered with stiff prickles. Sepals two to three, concave, mucronate; petals four to eight; peduncles axillary, always erect. Leaves sessile, repand-sinuated, usually spotted with white; recesses spiny-toothed. The species will thrive in almost any garden soil in the open border. Seed may be sown out of doors about the end of March; those of the rarer species on a hotbed, and planted out about the end of June.

A. albiflora (white-flowered).* *fl.* white; petals usually three. July and August. *l.* sessile, feather-nerved. *h.* 1ft. Georgia, 1820. Hardy annual.

A. grandiflora (great-flowered).* *fl.* large, panicled, white with yellow

anthers. July. *l.* sinuated, smooth, glaucous, spiny-toothed; nerves unarmed. *h.* 2ft. to 3ft. Mexico, 1827. This species, when raised from seed, does not flower until October; but when the roots have existed through the winter, the plants produce flowers early in the summer. Hardy perennial. See Fig. 147.

A. hirsuta (hairy).* *fl.* pure white, 3in. to 5in. in diameter. September. *l.* pinnatifid, bristly. *h.* 2ft. California, 1879. A very beautiful hardy annual.



Fig. 147. Inflorescence of Argemone grandiflora.

A. mexicana (Mexican). Devil's Fig. *fl.* solitary, yellow; petals four to six. June. *l.* profoundly repand-sinuated, spiny, blotched with white. *h.* 2ft. Mexico, 1592. Hardy annual.

A. ochroleuca (yellowish-white).* *fl.* pale yellow, solitary; petals six. August. *l.* profoundly sinuated or pinnatifid, glaucescent nerves with prickly bristles, blotched with white. Stem prickly. Mexico, 1827. Hardy annual.

ARGENTEUS. Silvery. A pale colour resembling silver.

ARGOLASIA. *See* **Lanaria**.

ARGIYREIA (from *argyreios*, silvery; in reference to the silvery undersides of the leaves). Silver-weed. ORD. *Convolvulaceæ*. An elegant genus of greenhouse and stove climbers. Sepals five; corolla campanulate. Shrubs for the most part silvery, but sometimes silky and tomentose. The greater number of the species are robust, extensive twiners or climbers, usually requiring plenty of room to run, before they will flower. *A. cuneata*, and one or two others, are of dwarf habit, and produce their splendid blossoms in abundance. All the species grow well in light rich soil, or a mixture of peat, loam, and sand. Cuttings root readily if planted in sand, with a hand glass placed over them, in a little bottom heat.

A. capitata (headed). *fl.*, corolla 1in. to 2in. long, rose coloured or purple, hairy outside; peduncles exceeding the petioles. July. *l.* cordate-ovate, acuminated, 2in. to 5in, long, and 1in. to 3in. broad, hairy on both surfaces; hairs glandular at the base. Plant clothed with strigose hairs. Silhet, 1823.

A. cuneata (wedge-leaved).* *fl.*, corolla large, of a beautiful deep bright purple; peduncles downy, shorter than the leaves, three to six-flowered. July. *l.* obovate-cuneate, emarginate, glabrous above, but beset with short, crowded hairs beneath, hardly petiolate. Stem clothed with powdery down at top. *h.* 2ft. to 5ft. India, 1822.

A. cymosa (cyme-flowered).* *fl.*, corolla pale pink, tubularly funnel-shaped, villous outside; peduncles as long or longer than the leaves, leafy at top, and cymosely many-flowered. *l.* roundish-cordate, or reniformly-cordate, obtuse, terminated by a very short prickle, glabrous on both surfaces, or clothed with pruinose down. Malabar (mountains), 1823.

A. malabarica (Malabar). *fl.* rather small; bottom of the bell deep purple; throat pink, with the edges paler, almost white, and slightly ten-lobed; peduncles as long or longer than the leaves, many-flowered at the apex. June. *l.* roundish-cordate, acute, glabrous, or furnished with a few scattered hairs on both surfaces. Coromandel, 1823.

A. pomacea (Apple-fruited). *fl.* large, rose coloured; peduncles villous, exceeding the petioles a little, cymose, many-flowered. Berry size of a cherry, yellow. *l.* ovate-

elliptic, obtuse, clothed with cinerous, velvety down on both surfaces, but especially beneath, sometimes sub-emarginate at apex. Mysore, 1818.

A. speciosa (showy).* *fl.*, corolla nearly 2in. long, of a deep rose colour; peduncles about equal in length to the petioles, umbellately capitate. July. *l.* 3in. to 12in. long, and 2in. to 4in. broad, cordate, acute, glabrous above, or rarely villous, thickly nerved beneath, and clothed with silky, silvery down. India, 1818.

A. splendens (splendid).* *fl.*, corolla tubularly campanulate, 1½in. long, rather villous outside, pale red; peduncles exceeding the (hoary) petioles, corymbosely many-flowered. November. *l.* ovate-oblong or ovate-elliptic, entire or pandurately sinuated, sometimes somewhat three-lobed, smooth above, but clothed with silvery, silky down beneath, 6in. long, acuminated. India, 1820.

ARGYROCHÆTA. A synonym of **Parthenium** (which *see*).

ARGYROXYPHIUM (from *argyros*, silver, and *xyphion*, a corn-flag; in allusion to the leaves). ORD. *Compositæ*. An ornamental greenhouse perennial herb. Involucre campanulate; receptacle conical; heads pedunculate, racemose, or in thyrsoid panicles.

Leaves alternate; lower ones close, elongated, thick, on both sides silver-lined. Stems simple or slightly branched. It thrives well in rich sandy loam and leaf mould. Propagated by seed-heads.

C. sandwicense (Sandwich Islands). *fl.-heads* purplish. *l.* linear lanceolate, imbricate, clothed, like the stems, with silvery hairs. *h.* 3ft. Sandwich islands, 1872. SYN. *Argyrophyton Douglasii*.

ARIA. *See* **Pyrus Aria**.

ARISÆMA (from *aron*, Arum, and *sana*, a standard; in reference to the close alliance to *Arum*). ORD. *Aroideæ*. Small tuberous rooted greenhouse (except where stated otherwise) herbaceous plants. Spathe rolled round the spadix at the base; spadix bearing unisexual flowers below. and rudimentary flowers in the upper part. Leaves peltate, pedate, palmate, or simple. For culture, &c., *see* **Arum.**

A. concinna (neat).* *fl.*, spathe convolute, tubular at the base; upper portion bent over at the mouth, and gradually narrowed into a tail-like appendage about 3in. long; spathe of the female plant longitudinally barred with white and green, the latter colour being replaced with blue-purple in the male. June. *l.* solitary, sheathing at the base, and made up of ten or twelve lanceolate, entire, light green leaflets, which radiate from the top of the petiole, the latter being 1ft. to 2ft. high.

Sikkim, 1871.

A. curvatum (curved).* *fl.* crowning a scape which overtops the foliage; tube of spathe cylindrical, green, obscurely striped with white; the elliptic blade arches forward, green on the inner surface, and brownish-red on the outer; spadix produced into a purplish-red tail, about 1ft. long. April. *l.* pedate. The large bracts, which sheath the base of the stem, are beautifully marbled with dark olive green, red, and light green. *h.* 4ft. Himalayas, 1871. SYN. *A. helleborifolium.*

A. galeata (helmeted).* *fl.*, spathe about 4in long; tube and cylindrical side of spathe green, tinted purplish at base, with many longitudinal white lines; inside of the tube purple. July. *l.* solitary, trifoliate; middle leaflet 6in. long by 3¾in. broad; lateral ones 7in. long and nearly 4in. broad. *h.* 1ft. Himalayas, Sikkim, 1879.

A. Griffithi (Griffith's).* *fl.*, spathe large, hood-like, brown-violet, with green veins; spadix brown-violet, and the barren end at the base above the flowers has a disk-like projection, while its free extremity is prolonged into a long thread-like appendage. Spring. *l.* with bold roundish leaflets. *h.* 1ft. to 1½ft. Sikkim, 1879. Hardy; very

handsome. SYN. *A. Hookerianum*.

A. helleborifolium (Hellebore-leaved). A synonym of *A. curvatum*.

A. Hookerianum (Hooker's). A synonym of *A. Griffithi*.

A. nepenthoides (Nepenthes-like).* *fl.*, spathe above the tubular portion extended into two decided auricles, which serve to distinguish it from other species, ochre, brown, green; spadix yellowish Spring. *l.* pedate, of five lanceolate or oblanceolate leaflets; central one 6in. long, the others shorter. *h.* 2ft. Himalayas, 1879.

A. præcox (early). A synonym of *A. ringens*.

A. ringens (gaping).* *fl.*, spathe striped green and white, erect and cylindrical below, then arching suddenly over, and again contracting into a rather small deep purple orifice, with broad, reflexed margins; spadix erect, pale yellow-green. Spring. *l.*, leaflets three, ovate-oblong, acuminate, and produced into a filiform point; peduncle short. Japan. Hardy. SYNS. *A. præcox* and *A. Sieboldi*.

A. Sieboldi (Siebold's). A. synonym of *A. ringens*.

A. speciosa (showy).* *fl.*, spadix deep glossy purple, greenish and

white, with a long flexuous prolongation, sometimes nearly 20in. in length; spathe also terminating with a filiform elongation. March. *l.* solitary, trifoliate; leaflets petioled, dark green, conspicuously edged with blood red; petioles long, mottled with white. *h.* 2ft. Temperate Himalayas, 1872.



Fig. 148. Arisæma triphylla.

A. triphylla (three-leaved).* *fl.*, spathe 4in. to 6in. long, striped with broad lines of purplish-brown, with about 1in. of green in the middle; spadix 3in. long, spotted with

brown. June to July. *l.* on long stout petioles, trifoliate; leaflets entire, equal, acuminated. *h.* 9in. to 1ft. North America, 1664. This is quite hardy. SYNS. *A. zebrina* and *Arum triphyllum*. See Fig. 148.

A. zebrina (zebra). A synonym of *A. triphylla*.

ARISARUM (name of Greek origin). ORD. *Aroideæ*. A small genus of half-hardy herbaceous plants, possessing but little horticultural interest, and allied to *Arisæma*. Flowers unisexual, spadix having no rudimentary flowers. Leaves on long stalks, heart-shaped or spear-shaped. The only species in cultivation thrives in a sand, loam, and peat compost. Propagated by seeds or divisions of the root in spring.

A. vulgate (common). *fl.*, spathe livid purple. May. *h.* 1ft. South Europe, 1596.

ARISTATE. Having a beard or awn, as the glumes of barley.

ARISTEA (from *arista*, a point or beard; in reference to the rigid points of the leaves). ORD. *Iridaceæ*. A genus of greenhouse herbaceous perennials from the Cape of Good Hope. Flowers blue; perianth rotate, six-parted, twisted after flowering; scape two-edged, rigid, often branched. Leaves narrow, sword-shaped. The species are more interesting than ornamental, and may be grown in a compost of three parts turfy peat, and one of loam. Easily propagated by divisions and seeds. They vary in height from 3in. to 3ft., and flower generally in summer.

A. capitata (headed). *fl.* blue. July. *h.* 3ft. Cape of Good Hope, 1790.

A. cyanea (bright blue). *fl.* blue. June. *h.* 6in. Cape of Good Hope, 1759.

ARISTOLOCHIA (from *aristos*, best, and *locheia*, parturition; in reference to its supposed medicinal character). Birthwort. ORD. *Aristolochiaceæ*. A very large genus of stove, greenhouse, or hardy, evergreen or deciduous, climbing or erect shrubs. Flowers axillary, clustered, or solitary, pendulous, of most extraordinary forms; perianth tubular, curved, or straight, with an oblique, cordate limb; stamens six, rarely four, or numerous, adhering to the stigma; capsule six-valved. Leaves cordate entire or lobed. Good loam, with a small proportion of decayed manure and a slight addition of sharp sand to secure efficient drainage, is a good compost for the whole. They will thrive when planted out in the conservatory more satisfactorily than elsewhere; for as they usually grow a considerable height before flowering, they require very long trellises in pots, and have to be trained up and down; or, better still, round a pillar of uniform circumference, a pyramid form being useless. The best way is to train them round, close down to the pot, and keep on about 2in. from one turn to the next. Some of the larger sorts will require more room. Cuttings root freely in sand under a bell glass with bottom heat.

A. anguicida (snake-killing). *fl.* white, spotted brown; tube of perianth inflated at base, dilated and oblique at the mouth; peduncles axillary, solitary, one-flowered.

December. *l.* on short petioles, cordate acuminate; stipules cordate-roundish. *h.* 10ft. New Grenada, 1845. An evergreen stove twiner.

A. barbata (bearded). *fl.* purple, axillary, 2½in. long; perianth straight; limb spreading; lip spathulate, bearded at the end. July. *l.* cordate, oblong. *h.* 10ft. Caraccas, 1796. Stove evergreen.

A. caudata (tailed).* *fl.* lurid; perianth cylindrical ventricose, and six-spurred at the base; lip cordate, cuspidate; the cusp twisted, filiform. June. *l.*, lower ones reniform, lobed; upper ones three partite. *h.* 5ft. Brazil, 1828. Deciduous stove twiner.

A. ciliosa (fringed).* *fl.* purple-yellow; tube of perianth obliquely ventricose at base, stretched out, from the middle to the apex cylindrical, fringed; peduncles one-flowered. September. *l.* cordate reniform. Plant glabrous. *h.* 6ft. Brazil, 1829.

A. Clematitis (Clematis-like). *fl.* pale yellow, upright; lip oblong, shortly acuminate. July. *l.* cordate. Stem erect. *h.* 2ft. A hardy herbaceous perennial, naturalised here and there in Britain.

A. clypeata (shielded). *fl.* axillary; tube yellowish, cylindrical; limb

elliptic, white, blotched with purple, long and large, funnel-shaped. *l.* subcordate-ovate, acuminate. Columbia, 1871.

A. cordiflora (cordate-flowered). *fl.* axillary, very large, with broad cordiform limb, creamy yellow, with blotchy purple veining. May. *l.* cordate acuminate. *h.* 30ft. Mexico, 1860.

A. deltoidea variegata (deltoid variegated variety). *l.* variegated with white. *h.* 6ft. Columbia, 1870.

A. Duchartrei (Duchartre's).* *fl.* racemose; tube brown; limb cream colour, with purple blotches. January. *l.* reniform-cordate, acuminate. Upper Amazons, 1868. *h.* 5ft. This stove species flowers from the old wood. SYN. *A. Ruiziana*.

A. floribunda (free-flowering).* *fl.* numerous; limb purplish-red, with yellow veins, centre yellow. July. *l.* cordate ovate, acuminate. *h.* 10ft. Brazil, 1868. Stove species.

A. galeata (helmeted). *fl.* creamy, with reticulated veins. August. *l.* cordate, with broad open sinus. *h.* 20ft. New Grenada, 1873.

A. gigas (giant). *fl.* purple; perianth large, cordate ribbed outside, reticulated, downy; tube inflated, contracted in the middle; limb large, cordate ovate, with a long tail. June.

l. downy, cordate, acuminate; peduncles solitary, bracteate. *h.* 10ft. Guatemala, 1841.

A. Goldieana (Goldie's).* *fl.* greenish outside, deep yellow with chocolate veins inside, bent into two unequal portions, the lower portion surmounting the ovary about 8in. in length, somewhat cylindrical, terminating in a club-shaped curved knob; the upper portion, commencing from this knob, is about a foot long, funnel-shaped, ribbed, dilated above into a somewhat three-lobed limb. Stamens twenty-four—a very unusual number in the whole family. The enormous flowers are 26in. long by 11in. in diameter. July. *l.* ovate, or triangular-cordate, acuminated. Old Calabar River, 1867. This noble climber should be repotted in fresh soil in February or March. But little water will be necessary until the young shoots have made about 6in. of growth; the quantity should then be increased with moderation until early in September, when the old stem dies down within a few inches of the surface of the pot—at this period, and during winter, water must be entirely withheld. This species blooms freely in a temperature of 65deg. to 70deg.

A. indica (Indian). *fl.* purple;

perianth erect; peduncle many-flowered. July. *l.* elliptical, blunt, somewhat emarginate, slightly cordate. *h.* 10ft. India, 1780. Stove evergreen.

A. labiosa (great-lipped).* *fl.* greenish; perianth incurved at base, saccate, two-lipped in the middle. July. *l.* reniform, roundish cordate, amplexicaul. *h.* 20ft. Brazil, 1821. Stove evergreen.

A. leuconeura (white-veined). *fl.* purple brown. September. *l.* cordate, acuminate. *h.* 12ft. Magdalena, 1858. Stove species.

A. odoratissima (sweetest-scented).* *fl.* purple, sweet-scented; peduncles one-flowered, longer than the leaf; lip cordate lanceolate, longer than the perianth. July. *l.* cordate, ovate, evergreen. Stem twining. *h.* 10ft. Jamaica, 1737. Stove evergreen.

A. ornithocephala (bird's-head).* *fl.* purple, very large, and extremely singular. To render any description at all lucid, this species may be said to have the head of a hawk and the beak of a heron, with the wattles of a Spanish fowl, which, however, are grey, netted with brown; head of the same colour, veined; and the beak grey. *l.* between cordate and reniform, obtuse. October. *h.* 20ft.

Brazil, 1838. Stove species.

A. ringens (gaping).* *fl.* extremely grotesque, 7in. to 10in. long, pale green, marbled and reticulated with black purple. The perianth has an obovoid ventricose sac, or cup, 2½in. long, which is woolly inside; tube ascending obliquely from the sac, terete, dividing into two very long lips, the upper of which (lower as the flower hangs) is oblong-lanceolate, recurved, and hairy inside below the middle, while the lower one is shorter, with recurved margins, and expanding into an orbicular or almost reniform limb. Unlike many other species, the flowers are produced on the young shoots. July. *l.* bright green, glabrous, roundish-reniform. *h.* 20ft. Brazil, 1820. Stove evergreen.

A. Ruiziana (Ruiz's). A synonym of *A. Duchartrei*.

A. saccata (pouch-flowered). *fl.* purplish-red, forming a large pouch; throat circular, vertical. September. *l.* 12in. to 15in. long, and 4in. broad, scattered, ovate-cordate, narrowed at apex, slightly waved and sinuated, entire, more silky beneath than above. *h.* 20ft. Sylhet, 1829. Stove evergreen.

A. sempervirens (evergreen). *fl.* purple; perianth incurved. May. *l.* cordate, oblong, acuminate. Stem

prostrate, flexuous, somewhat climbing. *h.* 4ft. Candia, 1727. Greenhouse species.



Fig. 149. Flowering Branch of Aristolochia Sipho.

A. Sipho (tube-bearing).* *fl.* yellowish-brown; corolla ascending; limb in three equal portions, not expanding, flat, brown; bracts of the peduncle large, ovate. May and June. *l.* cordate, acute. Stem twining. *h.* 15ft. to 30ft. North America, 1763. This hardy, climbing,

deciduous shrub grows freely in a deep, free, rather dry soil. See Fig. 149.

A. Thwaitesii (Thwaites'). *fl.* yellow. March. *h.* 3ft. Old Calabar, 1854. Stove species.

A. tomentosa (tomentose).* *fl.* purple; perianth with its tube twisted back, and much more deeply divided than in *A. Sipho*, expanding, flat, and yellow, with the mouth of the tube of a deep purple; peduncle solitary, without a bract. July. *l.* cordate, downy beneath. *h.* 20ft. North America, 1799. Hardy.

A. tricandata (three-tailed).* *fl.* dark purple-brown, solitary, split into three subulate tails. August. *l.* oblong acuminate, rugose, 5in. to 8in. long. Mexico, 1866. A curious, but pretty, stove shrub.

A. trilobata (three-lobed). *fl.* purple; perianth cylindrical, broken saccate at base; lip cordate cuspidate. June. *l.* three-lobed. Stem twining. *h.* 8ft. South America, 1775. Stove evergreen.

A. ungulifolia (claw-leaved). *fl.* racemose; perianth brownish-purple, stipitate at base, above which it is swollen out in a globose or oblong form, with two thickened projections near the end; upper end of tube contracted, somewhat curved,

terminating in a two-lipped limb, one lip large, ovate, the other minute. June. *l.* 6in. to 7in. long, cordate, and pedately five-nerved at the base, three-lobed below the middle, with broad sinuses, the two lateral lobes arcuate, and blunt at the apex. Labuan, 1880. Stove species.

ARISTOLOCHIACEÆ. An order of very curious plants, with singularly inflated flowers, consisting of a calyx only, of a dull, dingy colour. It is popularly known as the Birthwort family, and has an English representative in *Aristolochia clematitis*.

ARISTOTELIA (said to be named in honour of Aristotle, the Greek philosopher). ORD. *Tiliaceæ*. A hardy evergreen shrub. Calyx campanulate; petals five, inserted in the base of the calyx, and alternating with its lobes. Easily grown, in ordinary garden soil, in the shrubbery. Propagated by ripened cuttings, which root freely if placed under a hand glass; or by layers.

A. Macqui (Macqui's).* *fl.* small, greenish, axillary. May. *l.* nearly opposite, stalked, oblong, acute, smooth, shining, dentate, permanent. *h.* 6ft. Chili, 1733. A shrub esteemed for its handsome foliage. The berries are about the size of a pea, very dark purple, at length becoming black. The variegated form is not so hardy as the type, but much more ornamental.

ARMENIACA (from Armenia, the native country of the Apricot). Apricot. ORD. *Rosaceæ*. TRIBE *Drupaceæ*. Small, hardy, deciduous trees. Flowers appearing before the leaves from scaly buds, solitary, or few together, almost sessile. Leaves, when young, convolute. Drupe ovate-globose, fleshy, covered with velvety skin, containing a nut, or stone, which is acute at one end and blunt at the other, with a furrow on both sides; the rest smooth, not wrinkled. For culture, &c., *see* **Apricot** and **Prunus**.

A. brigantiaca (Brigancon).* *fl.* white or pink, glomerate, almost sessile. March. *l.* somewhat cordate, acuminated, sharply toothed; the teeth numerous, and lapping over each other. *h.* 6ft. to 8ft. South Europe, 1819.

A. dasycarpa (thick-fruited).* *fl.* white, pedicellate; pedicels filiform. March. *l.* ovate, acuminate, serrated; petioles glandular. *h.* 10ft. to 15ft. China, 1800.

A. sibirica (Siberian). *fl.* rose-coloured. April. *l.* ovate, acuminate; petioles glandless. *h.* 8ft. to 20ft. Dahuria, 1788.

A. vulgaris (common).* Common Apricot. *fl.* pinkish-white, sessile. February. *l.* ovate, or cordate, glabrous, glandularly serrated. *h.* 15ft. Levant, 1548. Of this species numerous varieties, differing in the foliar outline, &c., are sometimes met with. *See* **Apricot**.

ARMERIA. (from *Flos Armeriæ*, Latin name for the flowers of a species of Pink). Thrift; Sea Pink. ORD. *Plumbagineæ*. A very interesting and pretty group of hardy alpine tufted perennials. Flowers pedicellate, collected in dense solitary heads; involucre scarious, sheathing the scape and turned downwards; petals cohering at the base, persistent; flower scapes leafless. Leaves linear, radical. As the majority of the species differ in mere technical details, we have given a representative group only. They are easily cultivated in a sandy loam and leaf soil, and are increased by seeds and division, separate pieces being planted as cuttings under hand glasses; or the rarer kinds should be potted and placed in a frame. The seed should be sown in spring, in pots of sandy soil, and placed in a cold frame. Although best grown as rock plants, most of them do well in pots and borders. *A. vulgaris* makes one of the best of edging plants.

A. cephalotes (round-headed).* *fl.* deep rose or crimson, in a large roundish head on erect stalk. Autumn. *l.* broadly lanceolate, glabrous, acute; petioles channelled, sheathing at the base. *h.* 12in. to 18in. South Europe, 1800. This is perhaps the finest species, and is best raised from an annual sowing of seed, as it is somewhat difficult to increase by divisions. SYNS. *A. formosa*, *A. latifolia*, *A. mauritanica*, and *A. pseudo-armeria*.

A. dianthoides (Pink-like).* *fl.* light pink, in close heads about 6in. high. May and June. *l.* spreading,

flattened, nerved, slightly downy. South Europe, 1810.

A. formosa (handsome). Synonymous with *A. cephalotes*.

A. juncea (rush-like).* *fl.* rose pink, in small heads about 3in. high. June. *l.* small, erect, roundish, pointed, deep green. South Europe. A very pretty little alpine species.

A. juniperifolia (Juniper-leaved).* *fl.* deep rose, in small densely packed heads. May and June. *l.* short, stiff, erect, Juniper-like. *h.* 6in., with a dense tufted habit. Spain, 1818. Plant in a warm well-drained portion of the rockery in very sandy soil, with some nodules of sandstone intermixed.

A. latifolia (broad-leaved). Synonymous with *A. cephalotes*.

A. leucantha (white-flowered). A white-flowered variety of *A. plantaginea*.

A. maritima (sea). Synonymous with *A. vulgaris*.

A. mauritanica (Mediterranean). Synonymous with *A. cephalotes*.

A. plantaginea (Plantain-leaved).* *fl.* bright rose; scapes taller than in *A. vulgaris*. *l.* broader, three to five-nerved, and with a stouter growing habit than the common species. *h.*

1ft. South Europe, 1818. A very pretty species. SYNS. *A. leucantha*, which is frequently called *A. p. alba*, and *A. scorzoneræfolia*.

A. pseudo-armeria (false-Armeria). Synonymous with *A. cephalotes*.

A. scorzoneræfolia (Scorzonera-leaved). Synonymous with *A. plantaginea*.

A. setacea (bristly).* *fl.* light rose, in small heads about 2in. high, very freely produced from the axils of the leaves. April to June. *l.* in dense rosettes, erect, or nearly so, narrow, acute, the tufts having a bristly appearance. *h.* 3in. South Europe. Plant in a semi-perpendicular cranny of the rockery, with a sunny position.

A. vulgaris (common).* Common Thrift; Sea Pink. *fl.* pink, rosy red, lilac, or white (the latter known as *A. v. alba*), collected into a rounded head on the top of the simple scape. June to August. *l.* all radical, numerous, linear, usually one-nerved, more or less pubescent. *h.* 6in. to 12in. Britain, on the sea coasts. *A. v. alpina* is a dwarf alpine form of this species. The white-flowered variety is very handsome. *A. v. Laucheana* is also a pretty form, with deep pink flowers in dense heads about 6in. high, and a very tufted habit. *Crimson Gem*, of garden

origin, is stronger growing, with stems about 9in. high, carrying heads of bright crimson pink flowers, also of tufted habit. SYNS. *A. maritima*, *Statice Armeria*.

ARNEBIA (its Arabian name). ORD. *Boraginaceæ*. Handsome hardy herbaceous perennials or annuals, allied to *Lithospermum*. Cuttings should be removed with a heel in autumn, dibbled in sandy soil in small pots, and placed in a cool house, where they will ultimately, though slowly, root; they should then be gradually hardened off, and finally planted out. *A. echioides* is also easily increased by making cuttings of the strong roots, which should be dibbled in pots of sandy soil, and placed in gentle heat; it is also raised from seed.

A. echioides (Echium-like).* *fl.* bright primrose yellow, with a purplish spot in the sinuses between the lobes of the corolla, which gradually disappears in a few days; spikes terminal, large, solitary, secund. May. *l.* sessile, alternate; margins—as well as the stems—ciliated. *h.* 9in. to 12in. Armenia. One of the showiest of hardy perennials for the border or rockery.

A. Griffithii (Griffith's). This differs from above in having narrower leaves, rather smaller flowers, which are of a more decided yellow, a differently shaped calyx, and a longer corolla. *h.* 9in. North-west India. Equally desirable, were it a

perennial; but, being an annual, it must be constantly raised from seed.

ARNICA (from *arnakis*, lambskin; in reference to the texture of the leaves). ORD. *Compositæ*. Hardy, dwarf, herbaceous perennials, allied to *Senecio*. They thrive best in loam, peat, and sand; the plants are best divided in spring. Seeds should be procured when possible, and sown in a cold frame, in spring. The only species worth growing are described below.

A. Aronicum. Synonymous of *A. scorpioides*.

A. Chamissonis (Chamisso's).* *fl.-heads* yellow, 1½in. to 2in. across, arranged in a corymb. July to September. *l.* oblong-lanceolate, acuminate or acute, tomentose, tapering to the base. *h.* 1ft. to 2ft. North America. A rather scarce, showy species.

A. Clusii (Clusius's). *fl.-heads* yellow, solitary, terminal; stalks long, thickened towards the top, and covered with long hairs. Summer. *l.* soft, radical ones entire, or nearly so, oblong, obtuse, attenuated into the petiole; cauline ones sessile, half stem-clasping, lanceolate, toothed in the lower part. *h.* 1ft. Switzerland, 1819. SYN. *Doronicum Clusii*.

A. foliosa (leafy).* *fl.-heads* pale yellow, about 1in. across, from three to seven in a corymb. August. *l.* lanceolate, stalked, acute,

denticulate, smooth. *h.* 1ft. to 2ft. Stems springing from slender rhizome-like shoots. United States. Closely allied to *A. montana*. It requires a damp situation.

A. montana (mountain).* Mountain Tobacco. *fl.-heads* yellow, three or four together, about 2in. in diameter; ray florets numerous. July. *l.* radical, except a few on the scape, oblong-lanceo-late, entire, smooth. Habit tufted. *h.* 1ft. Europe. 1731. A very handsome but rare plant; excellent for a rockery. It is slowly increased. See Fig. 150.



FIG. 150. ARNICA MONTANA, showing Habit and Flower-head.

A. scorpioides (scorpion-like).* *fl.-heads* yellow, large, solitary; scape one to three-flowered. Summer. *l.*

pale green, denticulated; radical ones on long petioles, broadly ovate; the lower stem leaves shortly stalked, amplexicaul; the upper ones sessile. *h.* 6in. to 12in. South Europe, 1710. Border. SYNS. *A. Aronicum*, *Aronicum scorpioides*.

ARNOPOGON. *See* **Urospermum**.

AROIDEÆ. *See* **Araceæ.**

ARONIA. *See* **Cratægus Aronia** and **Pyrus**.

ARONICUM. *See* **Arnica scorpioides** and **Doronicum**.

ARPOPHYLLUM (from *arpe*, a scimitar, and *phyllon*, a leaf; the leaf is sword-shaped). ORD. *Orchideæ*. Distinct evergreen epiphytes. There are about six species known, and the genus belongs to the *Epidendreæ* division of orchidaceous plants; their general characters are: Flowers small, numerous, in closely packed cylindrical spikes; anther-bed broad, shorter than the broad extension of the upper edge of the stigma; pollinia eight. Stems rather long, with white sheaths. They thrive well in fibrous peat, one-third turfy loam, freely interspersed with lumps of fresh charcoal and an abundance of crocks. When growing, a liberal supply of water at the roots is essential, as is also a situation near the light, where they will blossom much more profusely than if in any way shaded. The flowers last in perfection about four weeks.

A. cardinale (cardinal). *fl.*, sepals and petals light rose; lip deep red, on upright spikes about 1ft. high. Summer. New Grenada.

A. giganteum (gigantic).* *fl.* dark purple and rose, densely and symmetrically arranged on the cylindrical spikes, which are from 12in. to 14in. long. April and May. *l.* dark green, about 2ft. long, borne on slender pseudo-bulbs. Mexico.

A. spicatum (spike-flowered).* *fl.* dark red, on an upright spike about 1ft. long. During winter. Guatemala, 1839.

ARRACACHA (its Spanish name in South America). ORD. *Umbelliferæ*. A half-hardy tuberous perennial, highly esteemed as an esculent in South America, where it yields a food, which is prepared in the same manner as potatoes, and is said to be grateful to the palate and extremely easy of digestion. It thrives best in rich loam, and is increased by divisions of the roots.

A. esculenta (edible). *fl.* white; umbels opposite the leaves or terminal; involucre wanting. July. *l.* pinnate; leaflets broadly ovate, acuminated, deeply pinnatifid, profoundly serrated; the two lower leaflets petiolate, sub-ternate. *h.* 1ft. to 2ft. Mountainous districts of Northern South America, 1823. SYN. *Conium Arracacha.*

ARRHOSTOXYLUM. Included under **Ruellia** (which *see*).

ARROW ARUM. *See* **Peltandra virginica**.

ARROWGRASS. *See* **Triglochin**.

ARROW-HEAD. *See* **Sagittaria**.

ARROWROOT. *See* **Maranta**.

ARTABOTRYS (from *artao*, to suspend or support, and *botrys*, grapes; in reference to the way the fruit is supported by the curious tendril). ORD. *Anonaceæ*. A handsome stove evergreen shrub, thriving in a good sandy loam and peat, to which a little rotten dung may be added. Propagated by cuttings made of ripened wood, insert in sand under a bell glass, with bottom heat, in early spring. Seed, when procurable, should be sown as soon after receipt as possible.

> **A. odoratissimus** (sweetest-scented).* *fl.* reddish brown, extremely fragrant; peduncles opposite the leaves, hooked beneath the middle. June and July. *l.* oblong-lanceolate, acuminated, smooth, shining. *h.* 6ft. Malayan Islands, 1758. In Java, the leaves are held to be invaluable as a preventive of cholera.

ARTANEMA (from *artao*, to support, and *nema*, a filament; in reference to a tooth-like process growing on the longer filaments). ORD. *Scrophularineæ*. An interesting and handsome greenhouse evergreen shrub, allied to *Torenia*. Flowers disposed in terminal racemes, and on short pedicels. Leaves opposite, sub-serrated. It may be treated as hardy during summer, for which purpose seeds should be sown in spring; but it requires the protection of a greenhouse during winter. Artanema grows freely in light rich soil, and is readily increased by cuttings and seeds.

A. fimbriatum (fringed). *fl.*, corolla blue, large, tubularly funnel-shaped, clothed with minute glandular pubescence outside; lobes unequally serrated; racemes terminal, four to sixteen-flowered. June, November. *l.* lanceolate, acute, serrated, rough to the touch from numerous elevated dots. Stem smooth, glossy. *h.* 2ft. to 3ft. New Holland (on the banks of the Brisbane River at Moreton Bay), 1830.

ARTANTHE. *See* **Piper**.

ARTEMISIA (from Artemis, one of the names of Diana). Mugwort; Southernwood; Wormwood. ORD. *Compositæ*. A very large genus of mostly hardy herbaceous perennials, few of which, comparatively speaking, are worth growing. Flower-heads disposed in spikes, or racemes, and these are usually arranged in panicles; pappus none; involucre few-flowered, ovate or rounded, imbricated; florets of the disk all tubular; of the ray, if any, slender, awl-shaped. Leaves alternate, variously lobed. All the species are of the easiest possible culture in any dry soil. The shrubby kinds are best propagated by cuttings; the herbaceous ones, by dividing at the root; and the annuals, by seeds.

A. Abrotanum (aromatic herb).* Southernwood. *fl.-heads* yellowish. August to October. *l.*, lower ones bipinnate; upper ones pinnate, with the segments hair-like. Stem straight. *h.* 2ft. to 4ft. Europe, 1548. A deciduous shrub; well known for its

fragrance.

A. A. humile (low). A low spreading variety. *h.* 1½ft.

A. A. tobolskianum (Tobolskian). A much more vigorous growing variety than the last, and larger in all its parts than the type.

A. alpina (alpine).* *fl.-heads* yellow, solitary, on long slender stalks; scales of involucre lanceolate. Summer. *l.* pinnate, covered with whitish silky hairs; lobes linear, entire. *h.* 6in. to 10in. Caucasus, 1804. Dwarf, with a very tufted habit.

A. anethifolia (Anethum-leaved). *fl.-heads* yellowish-green, small; panicle very large, densely packed, nearly 2ft. long. Autumn. *l.* chiefly cauline, much divided into thread-like segments, greyish-green. Stem shrubby at the base, nearly glabrous, branching at the top. *h.* 3ft. to 4ft. Siberia, 1816.

A. argentea (silvery).* *fl.-heads* pale yellow, roundish, closely packed. July. *l.* ovate-oblong, very freely divided, densely clothed with soft silvery hairs. *h.* 1½ft. Madeira, 1777. A very pretty species, requiring a warm sunny position on the rockery.

A. cana (hoary).* *fl.-heads* yellow, small, uninteresting, ovate, in a close spiky panicle. August. *l.* silky, hoary;

lower ones wedge-shaped, sharply three-cleft; cauline ones linear-lanceolate, three-nerved. Stem ascending; branches erect. *h.* 2ft. to 3ft. North America, 1800. This is a very distinct species, and its silvery leaves and stems render it well worthy of cultivation.

A. cœrulescens (bluish).* *fl.-heads* bluish, erect, cylindrical. August. *l.* hoary, most of them lanceolate, entire, tapering at the base; lower ones variously divided. *h.* 2ft. South Europe. An ornamental evergreen shrub.

A. Dracunculus.* Tarragon. *fl.-heads* whitish green; racemes panicled; heads sub-globose. July. *l.*, radical ones three-fid; cauline ones sessile, linear or linear-oblong, acute, entire, toothed. *h.* 2ft. South Europe, 1548. *See* **Tarragon**.

A. frigida (frigid). *fl.-heads* yellow, uninteresting, small, roundish, racemosely panicled. August. *l.* pinnate; segments narrow, silvery. *h.* 1ft. Siberia, 1826. A pretty creeping, herbaceous plant.

A. maritima (maritime). *fl.-heads* brown; racemes oblong, erect or drooping. August and September. *l.* downy, bipinnatifid, oblong; segments linear. Britain. A much branched, erect, or decumbent plant, excellent for rough rockwork or very

dry banks, etc.

A. Mutellina (Mutellina).* *fl.-heads* yellowish-green; lower ones stalked, upper ones sessile. July. *l.* all palmate, multifid, white. Stem quite simple. *h.* 6in. European Alps, 1815.

A. pontica (Pontine). *fl.-heads* yellow, roundish, stalked, nodding. September. *l.* downy beneath; cauline ones bipinnate; leaflets linear. *h.* 3ft. Austria, 1570.

A. rupestris (rock). *fl.-heads* brown, globose, stalked, nodding. August. *l.* sub-pubescent; cauline ones pinnatifid; leaflets linear, acute. *h.* 6in. Norway, &c., 1748.

A. scoparia (twiggy-branched). *fl.-heads* small, whitish; panicle broad, densely packed, about 1½ft. long. Autumn. *l.* much divided; segments hair-like; lower branches very slender. *h.* 3ft. to 5ft. East Europe.

A. spicata (spicate). *fl.-heads* brown, spicate. June and July. *l.* hoary; radical ones palmate multifid; cauline ones pinnatifid; upper linear, entire, blunt. Stem quite simple. *h.* 1ft. Switzerland, 1790.

A. Stelleriana (Steller's).* *fl.-heads* yellow, uninteresting, round, somewhat erect. Summer. *l.*, lower ones spathulate-incised; upper ones obtusely lobed; end lobes often confluent, about 2in. long, silvery

white. *h.* 1ft. to 2ft. Siberia.

A. tanacetifolia (Tanacetum-leaved). *fl.-heads* brownish; racemes simple, terminal. Summer. *l.* bipinnate; lobes linear sub-lanceolate, entire, acuminated, rather downy. Stem sometimes branching at the base, herbaceous. *h.* 1½ft. Siberia, 1768.

A. vulgaris (common).* Mugwort. *fl.-heads* yellow, somewhat racemed, ovate. August. *l.* pinnatifid; segments white, and downy beneath. Stems 3ft. to 4ft. high, furrowed. Britain. The variegated form of this species exhibits a very pleasing contrast. There is also a pretty variety with golden leaves.

ARTHROPHYLLUM MADAGASCARIENSE. *See* **Phyllarthron Bojeriana**.

ARTHROPODIUM (from *arthron*, a joint, and *pous*, a foot; the footstalks of the flowers being jointed). ORD. *Liliaceæ*. Very pretty greenhouse herbaceous perennials, allied to *Anthericum*. Flowers purplish or white, in loose racemes. Leaves grass-like, radical. They thrive well in a compost of sandy loam and peat, and may be increased freely by divisions or seeds.

A. cirratum (curled). *fl.* white; racemes divided; bracteas leafy. May. *l.* lanceolate, ensiform, spreading, 1ft. long. *h.* 3ft. New Zealand, 1821.

A. fimbriatum (fringed). *fl.* white. July. *h.* 1½ft. New Holland, 1822.

A. neo-caledonicum (New Caledonian).* *fl.* small, white, on a much-branched, many-flowered panicle. May. *l.* tufted, linear-lanceolate, barred with black linear markings near the base. *h.* 1½ft. New Caledonia, 1877.

A. paniculatum (panicled).* *fl.* white; racemes divided; pedicels clustered; inner sepals crenulate. May. *l.* narrowly lanceolate. *h.* 3ft. New South Wales, 1800. *A. minus* is a small form of this species.

A. pendulum (pendulous).* *fl.* white, clustered in threes, pendulous. June to August. *l.* linear, keeled, shorter than the branched scape. *h.* 1½ft. New Holland, 1822.

ARTHROPTERIS. *See* **Nephrodium** and **Nephrolepis**.

ARTHROSTEMMA (from *arthron*, a joint, and *stemon*, a stamen; in reference to the stamens or connectives being jointed). ORD. *Melastomaceæ*. Beautiful stove or greenhouse evergreen shrubs. Tube of calyx turbinate or campanulate, usually clothed with bristles, pili, or scales; lobes four, lanceolate, permanent, without any appendages between them; petals four. A mixture of loam, peat, and sand, suits them best; and cuttings of small firm side shoots will root, in April or August, under a hand glass in sandy soil. Only three or four out of the half-dozen species belonging to this genus have been

as yet introduced.

A. fragile (brittle). *fl.* rosy; cymes loose, terminal, few-flowered; calyx glandular. July. *l.* ovate-cordate, acute, five-nerved, serrated; branches tetragonal, beset with glandular hairs. *h.* 3ft. Mexico, 1846. Stove species.

A. nitida (glossy-leaved). *fl.* lilac; peduncles axillary towards the top of the branches, three-flowered, longer than the petioles. June. *l.* ovate, acute, serrulated, glabrous on both surfaces, shining above, but glandularly hispid on the nerves beneath. Stems shrubby, erect, and are, as well as the branches, tetragonally winged, beset with coloured hairs. *h.* 2ft. to 3ft. Buenos Ayres, 1829 greenhouse species.

A. versicolor (changeable-flowered). *fl.*, petals obovate, ciliated, at first white, but at length becoming reddish, terminal, solitary. September. *l.* petiolate, ovate, serrulated, five-nerved, discoloured beneath. Plant shrubby; hairy. *h.* 1ft. Brazil (on the sea shore), 1825. Stove species.

ARTHROTAXIS. *See* **Athrotaxis.**

ARTICHOKE, GLOBE. (*Cynara Scolymus*, a cultivated form of *C. Cardunculus*). As a vegetable, the Globe Artichoke is cultivated for the use of the immature

flower-heads, and is highly esteemed. A good open position, free from overhanging trees, is best suited for its culture generally, but, by planting successional suckers in different aspects, the season may be considerably prolonged. The soil must be of good depth, rich, and not too heavy. It may be greatly improved for Artichoke culture by the addition of sea-weeds or salt applied as manure.



Fig. 151. Globe Artichoke.

Preparation of Soil. Trench the ground two spits deep if possible, mixing a liberal dressing of well-rotted manure in autumn, and ridge up for the winter, to sweeten. Crude manure full of straw, leaves, and sticks, often induce fungoid growths, and are most injurious to the crowns of the plants. Clay or stiff loam is about the worst soil on which to attempt the culture of this vegetable; this drawback may, however, to some extent be alleviated by the addition and thorough amalgamation of a light free soil or liberal dressings of sandy road drifts, or similar materials. An ill-drained soil is also fatal to good results. During hot, dry weather, the plants are greatly benefited by copious applications of clear water and dilute liquid manure; and this must be especially attended to on such soils as are liable to burn or dry up in summer.

Cultivation. When the beds have been properly prepared, the plants should be put in them in April or May. Place three together in rows between 3ft. and 4ft. apart, and about 3ft. from plant to plant. Water-in carefully to settle the soil around the roots, and apply a mulching of half-decayed manure, to prevent an undue evaporation of moisture. During hot, dry weather, give liberal supplies of water, and the plants will become established as fine stools the first season. A few heads will probably be produced the first year; but there will not be much of a crop until the second season, when five or six good heads will be got from each plant, and for three or four years the produce will be large if the beds are properly attended to; after which time it will become desirable to make up new plantations. In October or November, it will be necessary to apply a good mulching of straw or fern to the beds, to protect the plants from frost. In April, all this litter should be cleaned off, a dressing of rotten manure applied, and the beds forked over and kept clean for the rest of the season, treating as before described. Great care must be taken to remove the heads as soon as they are in a fit state; and, when the whole of them are removed from the stems, cut the latter out as low as possible. Globe Artichokes will keep for some considerable time if laid in a cool place, although they will deteriorate in quality. These plants may be used in the background of flower borders in the kitchen garden, their handsome foliage being peculiarly well adapted for such purposes, whilst their economical value is also secured. See Fig. 151. Where there is plenty of room in light, warm sheds, orchard houses, or other places where frost can be kept out, some stools can be taken up with the root intact in the early part of November, placed in boxes

of soil, and well watered-in. When drained, the boxes may be put in any of those positions for their winter quarters, and, if kept moist, will develop much earlier than the outdoor crops, provided they are planted out early in April on a warm border, and protected with mats when the weather is cold. Propagation may be effected by seeds, or by suckers from the old stools, the latter being the better plan. In the former case, sow the seeds in March, on a gentle hotbed, and prick the seedlings off singly, when large enough, into small pots. Harden off by the last week in May, and plant out in threes as previously recommended, protecting the plants from late frosts. During the growing season, give an abundance of water and liquid manure mulching, to prevent undue evaporation. In November, well cover with dry litter which will not heat; and, in hard frosts, or heavy snow, throw a few mats over the beds, uncovering at the same time as recommended above for the older plants. To propagate by rooted offsets or suckers, take up and divide the stools, when they have made a fair amount of growth in April or early in May, separating the suckers with as many roots and as much soil adhering to them as possible. The old woody portions are of little use, but they may be replanted to give off a fresh supply of suckers for the next year, if required. Propagation by suckers, if they are to be obtained, has many advantages; but care must be taken, in removing them from old plants, that some roots are attached, or growth will be uncertain. Seeds generally produce a large percentage of plants that are useless, and this is not found out until the flower-heads appear. On the other hand, suckers reproduce the parent plant, and if these are previously selected, the superior stock is thereby perpetuated.

Sorts. The Green and Purple are the best for ordinary purposes; and of these preference should be given to the former. *See also* **Cynara**.

ARTICHOKE, JERUSALEM (*Helianthus tuberosus*). A hardy tuberous-rooted herbaceous perennial, native of Brazil. The roots are used as a vegetable principally during the winter, sometimes as a dish, but more generally for flavouring purposes. Plants will grow in almost any position, but the best results and largest tubers are obtained where they receive plenty of room and liberal treatment. Their culture has been recommended as a substitute for the potato, but they are not likely to take the place of this vegetable, the flavour being disliked by many persons. A few are, however, generally acceptable.

Cultivation. To ensure the most successful results, trench over a piece of ground in autumn, and give a light dressing of manure. Fork over in March; at the same time plant good-shaped tubers (see Fig. 152) in rows about 3ft. apart, and allow from 18in. to 2ft. between the tubers in the rows. Keep clear of weeds; and, as soon as the foliage is yellow, in the latter part of the autumn, the roots will be fit for use. The best plan with this crop is to leave it in the ground till wanted, or till the end of February, and then to take up every tuber, replanting those which are wanted for stock, and storing the others away in a cold dry place. When they commence growth, they turn black, and are of little use for cooking, save for flavouring soups. This vegetable has of late years grown into favour as a marketable crop, and the demand seems to be increasing. Considering its very easy culture, it is fairly remunerative. *See also* **Helianthus**.



Fig. 152. Tubers of Jerusalem Artichoke.

ARTICULATE, ARTICULATED. Jointed; having joints.

ARTILLERY PLANT. *See* **Pilea microphylla**.

ARTOCARPEÆ. A tribe of the large order *Urticaceæ*.

ARTOCARPUS (from *artos*, bread, and *carpos*, fruit; the fruit, when baked, resembling bread). Bread Fruit. Syns. *Polyphema*, *Rademachia*, *Rima*. Ord. *Urticaceæ*. Tribe *Artocarpeæ*. Included in this most remarkable tribe, in addition to the Bread Fruit Tree, is the virulent poisonous *Antiaris toxicaria*, and the economic Cow Tree (*Brosimum Galactodendron*), of Caraccas. A genus of stove evergreen trees, requiring a high and very moist atmosphere, a copious supply of water, perfect drainage, and a compost of two parts rich loam and one of leaf mould, with the addition of a little silver sand. Under all conditions, this genus is difficult to propagate; the young and slender lateral growths are adapted for cuttings; and suckers may be utilised when procurable, which is very rare.

A. Cannoni (Cannon's).* *l.* alternate, petiolate; petiole and midrib bright red; upper surface glossy, of a rich,

full bronzy crimson hue, beautifully tinted with purple; under surface bright vinous red. The leaves vary much in form; some are simple and cordate at the base, with the apex irregularly lobate; some have the apex regularly three-lobed, with short, entire lobes; and others, again, are deep three-lobed, being divided nearly to the base, the segments, of which the centre one is largest, being slightly sinuate-lobed. *h.* 7ft. Society Islands, 1877. This is a most distinct and handsome ornamental-leaved plant.

A. incisa (incised).* True Bread Fruit. *l.* from 2ft. to 3ft. long, deeply lobed or incised, deep green on the upper side, paler below. *h.* 50ft. South Sea Islands, 1793. This is a noble tree when full grown, and forms a most distinct and beautiful stove plant. The extraordinary fruit is produced from the axils of the leaves in large globular heads, and is highly valued as an article of food in its native country.

A. integrifolia (entire-leaved). *l.* oblong, undivided, sinuated, scabrous, downy beneath. *h.* 30ft. India, 1778.

A. laciniata metallica (laciniate, metallic). *l.* bronzy above, reddish purple beneath. Polynesia.



Fig. 153. Arum maculatum.

ARUM (formerly *aron*, and probably of Egyptian extraction). Ord. *Aroideæ*. A large genus of ornamental or curious, hardy, greenhouse or stove perennials, with thick rhizomes and pedate or hastate leaves. Spathe large, convolute; spadix naked and club-shaped at the top. They are all of easy

culture, and the indoor species will thrive with such treatment as is given to *Alocasias*, *Caladiums*, &c. Rich soil is one of the first conditions of success. Like most plants grown for the beauty of their foliage, rapid and free growth is necessary. A compost of good rich loam, with a third of sweet manure, thoroughly rotted, or leaf mould, with some sharp sand, is very suitable. Plenty of moisture is necessary during the growing season, after which the tender kinds should be kept moderately dry, warm, and at rest during the winter. The hardy kinds may be left in the ground. Propagated by seeds or division of the roots—usually the latter. The best time to divide them is just as they commence their new growth, securing as many roots as possible to each division. Any rootless pieces should be placed in heat shortly after removal; this hastens the formation of roots and excites top growth. Arums are useful in sub-tropical gardening, and are otherwise interesting plants both for indoors and outside cultivation; and the hardy kinds are very suitable for naturalising in woodlands, &c. There are many other species besides those here described, but the following list comprises the best. Sub-sections of the genus will be found treated separately, such as **Amorphophallus** (which *see*), &c.



Fig. 154. Arum Dracunculus.

A. bulbosum (bulbous). Synonymous with *A. ternatum*.

A. Dracontium (Green Dragon). *fl.*, spadix subulate, longer than the oblong convolute green spathe. June. *l.* pedate, entire. *h.* 2ft. North America, 1759. Hardy.

A. Dracunculus (Common Dragon).* *fl.*, spadix lanceolate, shorter than the ovate, flat, smooth, brown spathe. July. *l.* pedate, entire. *h.* 3ft. South Europe, 1548. Hardy. Syn. *Dracunculus vulgaris*. See Fig. 154.

A. indicum (Indian). *See* **Colocasia indica**.

A. italicum (Italian).* *fl.*, spathe ventricose below, opening nearly flat and very broad above; apex often falling over very shortly after expansion, sometimes greenish yellow, at others nearly white; spadix yellowish or creamy white, club-shaped, about one-third as long as the spathe. Spring. *l.* appearing before winter, radical, triangular-hastate. *h.* 9in. to 2ft. Channel Islands and Cornwall, &c. Hardy.

A. i. marmorata (marbled).* *l.* marbled with yellow. A very pretty and effective hardy border plant.

A. maculatum (spotted). Lords and Ladies; Cuckoo Pint. *fl.*, spathe ventricose below and above, constricted in the middle, with inflexed edges when open, spotted with dull purple; spadix usually purple, shorter than the spathe. Spring. *l.* vernal radical, hastate-sagittate, with deflexed lobes. *h.* 9in. Britain, &c. This species is admirably adapted for a corner in the wild garden. See Fig. 153.

A. Malyi (Maly's). *fl.* whitish. Montenegro, 1860.

A. Nickelli (Nickel's). Levant, 1859. A form of *A. italicum*.

A. orientale (eastern). *fl.* resembling those of *A. maculatum*. June. *l.* brownish, simple, ovate, slightly

sagittate. *h.* 1ft. Tauria, 1820. Hardy.

A. palæstinum (Palestine).* *fl.*, spathe 7in. to 11in. long, purplish blotched or spotted outside, rich velvety black inside and yellowish white at the base of the tube; spadix much shorter than the spathe; petiole usually rising 8in. or 9in. above the leaves. May. *l.* four or five, triangular-hastate, acute, from 6in. to 14in. long, and from 3½in. to 7½in. broad; petioles 12in. to 18in. long. Jerusalem, 1864. Tender.

A. pictum (painted). *h.* 2ft. Corsica, 1801. Hardy.

A. proboscideum (proboscis-like).* *fl.*, spathe greenish purple, navicular, horizontal, terminated by a straight tail; scapes arising from among the petioles. May. *l.* radical, about four, cordate-elliptic, entire. *h.* 6in. South Europe, 1823. Hardy.

A. spectabile (showy). *fl.*, spathe ovate-oblong, acuminate, dark purplish inside, longer than the purplish spadix. *l.* broadly hastate-sagittate. *h.* 1ft. Asia Minor. Half-hardy.

A. spirale (spiral). *fl.*, spadix lanceolate, shorter than the oblong-lanceolate spirally twisted brown spathe. May. *l.* linear-lanceolate. Plant stemless. *h.* 1ft. China, 1816.

Tender.

A. tenuifolium (narrow-leaved).* *fl.*, spadix subulate, longer than the white lanceolate spathe. April. *l.* linear-lanceolate. Plant stemless. *h.* 1ft. South Europe, 1570. Hardy.

A. ternatum (three-leafleted). A synonym of *Pinellia tuberifera*.

A. variolatum (variegated). Dalmatia, 1859. Hardy.

A. venosum (veined). A synonym of *Sauromatum guttatum*.

A. Zelebori (Zelebor's). A form of *A. maculatum*.

ARUM LILY. *See* **Richardia æthiopica**.

ARUNDINARIA (altered from *arundo*, a reed). ORD. *Gramineæ*. A small genus of hardy or nearly hardy shrubby grasses, having strong jointed stems, and frequently included under *Bambusa*. For sub-tropical gardening purposes more particularly it is exceedingly ornamental as an isolated tuft. It thrives best in a deep, rich soil, and requires plenty of water when in a growing state. Increased by division of the roots.



Fig. 155. Arundinaria falcata.

A. falcata (sickle-shaped).* *l.* linear-lanceolate, very acute, shortly stalked, very light green. Stems freely branched, deep green, and very slender. *h.* 3ft. to 6ft. India. An extremely handsome species for greenhouse decoration; also for outdoor work, particularly in the South of England, &c. Syn. *Bambusa gracilis*, of gardens.

A. Maximowiczii (Maximowicz's). This Japanese species is believed to be allied to, if not identical with, *Bambusa Simonii.* Quite hardy.

A. Metake (Metake). *l.* lanceolate,

with very sharp points, dark green, persistent, narrowed into a short leafstalk, 6in. to 12in. long; sheath ample. *h.* 4ft. to 6ft. Japan. A handsome, hardy, dwarf, much-branched species, forming grand specimens, and producing flowers very freely. SYN. *Bambusa japonica*.

ARUNDO (origin of word doubtful; stated by some authorities to be from *arundo*, a reed; and others as from the Celtic *arn*, signifying water). Reed. ORD. *Gramineæ*. A very ornamental group of half or quite hardy plants, of very easy culture in ordinary garden soil, preferring damp situations. Panicle loose; calyx two-valved, unequal, many-flowered; corolla of two very unequal valves; all, except the lower and imperfect one, surrounded by a tuft of hairs. Fruit free, covered by the corolla. Arundos are very valuable either for conservatory decoration, sub*-tropical gardening, or cultivation in clumps on the turf of the flower-garden or pleasure ground, and the margins of lakes. Although well worth growing, all are inferior to their ally, the Pampas Grass. Propagated by seeds or divisions, the spring being the best time to adopt either method of increase.

A. conspicua (conspicuous).* *fl.* silky-white, on large drooping racemes, and lasting in beauty for several months. *h.* 3ft. to 8ft., but in a good deep and sandy loam it sometimes attains the height of 12ft. New Zealand, 1843. This fine species grows in dense tufts, from which arise numerous leathery, narrow, smooth (or slightly rough), long

curving leaves, and erect, slender culms. The plant is not sufficiently hardy to withstand a severe winter, and should, therefore, be protected with mats, or be grown in tubs, so that it can be removed under shelter before the approach of winter. These precautions are unnecessary in the more southern counties of England.

A. Donax (Donax).* Great Reed. *fl.* reddish, ultimately whitish, in numerous spikelets, forming a large compact panicle 12in. to 16in. long. Autumn. *l.* alternate, lanceolate-acute, large, and ornamental, glaucous green, arching. *h.* about 12ft. South Europe, 1648. This also requires protection during winter in the colder counties. See Fig. 156.

A. D. versicolor (various-coloured).* *h.* 3ft. South Europe. Although much smaller, this variety is far superior to the type for gardening purposes, and has its leaves ribboned with white. It requires a deep, well drained, sandy loam to thrive well, and a thorough winter protection of cocoa-fibre refuse or coal ashes. For isolated tufts or groups, few plants can equal it. It is propagated by placing a stem in water, which induces little rooted plants to start from the joints; these should be separated, potted off, and kept in frames until thoroughly

established.

A. mauritanica (Mediterranean Reed). This is a rare greenhouse species, closely allied to *A. Donax*, but inferior to it.



Fig. 156. Arundo Donax.

ARYTERA. A synonym of **Ratonia** (which *see*).

ASAFŒTIDA. *See* **Narthex Asafœtida**.

ASARABACCA. *See* **Asarum europæum.**

ASARUM (from *a*, not, and *saron*, feminine; derivation doubtful). ORD. *Aristolochiaceæ*. Curious hardy herbaceous perennials, with bell-shaped, three-cleft perianths. They should be planted at the foot of the rockery, or in borders or woodlands, as they are not very showy, but are, nevertheless, worth growing, and easily propagated by divisions, in spring.

A. canadense (Canadian).* *fl.* brown, campanulate, on a short peduncle, sometimes nearly buried. May and June. *l.* in pairs, broadly reniform. *h.* 1ft. Canada, &c., 1713.



FIG. 157. ASARUM CAUDATUM.

A. caudatum (tailed).* *fl.* brownish-red, with attenuated or caudate calyx lobes. July. *l.* cordate-

reniform, hooded, sub-acute, or bluntish, slightly pubescent. California, 1880. A rare and pretty species. See Fig. 157.

A. europæum (European). A sarabacca. *fl.* dull brown, solitary, rather large, drooping; segments of perianth incurved. May. *l.* two on each stem, roundish-reniform, stalked, slightly waved. *h.* 1ft. England.

ASCENDING. Directed upwards; as the stem, which is the ascending axis.

ASCLEPIADEÆ. A large order of, for the most part, lactescent, climbing shrubs. Flowers sub-umbellate, fascicled or racemose, interpetiolar; pollen collected in the form of waxy masses, coalescing to the cells of the anthers; follicles two, one of which is abortive. Leaves entire, usually opposite.

ASCLEPIAS (the Greek name of Æsculapius of the Latins). Swallow-wort. ORD. *Asclepiadeæ*. Erect, hardy, herbaceous or sub-shrubby perennials, except where otherwise specified. Corolla five-parted, reflexed; umbels interpetiolar; corona seated on the upper part of the tube of the filaments, five-leaved. Leaves opposite, verticillate, sometimes alternate. Most of the hardy species are very handsome border plants, thriving in peaty, or light rich soil, and are increased by dividing the roots in spring, and sometimes also by seeds. The doubtfully hardy or rarer species should always be grown in a peat soil, and have a little protection during severe frost, by mulching the roots. The most important of the greenhouse and stove species is *A. curassavica*. In

order to obtain good bushy specimens of this, it will be necessary to cut the plants back annually, after keeping them slightly dry, and resting for a month or two in midwinter. When growth has sufficiently advanced, they should be shaken out and repotted. At this stage, a close, moist atmosphere will be needful to produce the usually very free growth. The points of the shoots must be nipped out, in order to promote a bushy habit. When the pots have become filled with roots, liquid manure may be applied; but it must be quite clear and not over strong. All the indoor species grow best in good fibry loam and leaf mould, and require to be potted firmly. Cuttings should be secured in spring, struck in gentle heat, under a bell glass, and as soon as they are well rooted, potted into 60-size pots. A shift must be given as often as the pots become filled with roots, up to the time when the plant commences flowering. Seeds may be sown in pots in spring, pricked out singly when large enough, and then treated similarly to cuttings.

A. acuminata (taper-pointed).* *fl.* red and white; umbels lateral, solitary, erect. July. *l.* ovate, sub-cordate, acuminated, on short petioles; superior ones sessile, glabrous, but rough on the edges. Stems erect, glabrous, simple. *h.* 2ft. New Jersey, 1826. Hardy, herbaceous.

A. amœna (pleasing).* *fl.* beautiful purple; umbels terminal, erect; appendages of corona exserted, red. July. *l.* opposite, almost sessile, oblong-oval, downy beneath, with a

large purple middle nerve. Stem simple, with two rows of down. *h.* 2ft. to 3ft. New England, 1732. Hardy, herbaceous.

A. Cornuti (Cornuti's).* Synonymous with *A. syriaca*.

A. curassavica (Curassavian). Redhead. *fl.* reddish orange-scarlet; umbels erect, solitary, lateral. July to September. *l.* opposite, oblong-lanceolate, tapering at both ends. Stem rather downy, simple, seldom a little branched. *h.* 1ft. to 3ft. Tropical America, 1692. The white-flowered variety is a very pretty contrast. Stove herbaceous.

A. Douglasii (Douglas's).* *fl.* large, waxy, purplish-lilac, sweet-scented, in many-flowered umbels. Summer. *l.* opposite, ovate-cordate, acuminated, 6½in. long by 5in. or more wide, glabrous above, downy beneath. Stem thick, woolly, simple. *h.* 2ft. to 3ft. West America, 1846.

A. hybrida (hybrid). A synonym of *A. purpurascens*.

A. incarnata (flesh-coloured).* *fl.* red or purplish; umbels numerous, usually twin. July. *l.* opposite, lanceolate, rather woolly on both surfaces. Stem erect, branched and tomentose at the top. *h.* 2ft. Canada (on the banks of rivers), 1710. Hardy, herbaceous.

A. mexicana (Mexican). *fl.* white; umbels many-flowered. July. *l.* verticillate, linear-lanceolate, with revolute edges; lower ones four to six in a whorl; upper ones three in a whorl, or opposite. *h.* 2ft. to 3ft. Mexico, 1821. Greenhouse evergreen.

A. phytolaccoides (Phytolacca-like). *fl.* purple; corona white, with truncate leaflets; umbels lateral and terminal, solitary, on long peduncles, drooping. July. *l.* broad, ovate-oblong, acute, glabrous, paler beneath. Stem erect, simple, spotted with purple. *h.* 3ft. to 4ft. Virginia and Carolina (on the mountains), 1812.

A. purpurascens (purplish). *fl.* purple; umbels erect. July. *l.* opposite, large, ovate, with a purplish middle nerve, villous beneath. Stem simple, rather hairy at top, brownish green at bottom. *h.* 2ft. to 3ft. Virginia (in shady swamps), 1732. Hardy. SYN. *A. hybrida*.

A. quadrifolia (four-leaved).* *fl.* white, small, sweet-scented, with red nectaries; umbels twin, terminal, loose-flowered; pedicels filiform. July. *l.* ovate, acuminated, petiolate; those in the middle of the stem larger, and four in a whorl; the rest opposite. Stems erect, simple,

glabrous. *h.* 1ft. New York, 1820. Hardy species.

A. rubra (red), *fl.* red; umbels compound, July, August. *l.* alternate, ovate, acuminated. Stem erect, simple. *h.* 1ft. to 2ft. Virginia, 1825.

A. Sullivanti (Sullivant's). Similar to *A. syriaca*, but having larger and deeper coloured flowers.

A. syriaca (Syrian).* *fl.* pale purple, sweet scented, in large, loose, drooping umbels. July. *l.* opposite, lanceolate-oblong, or oval, gradually acute, tomentose beneath. Stems simple. *h.* 3ft. to 5ft. North America, 1629. SYN. *A. Cornuti*.



FIG. 158. FLOWERING BRANCH OF ASCLEPIAS TUBEROSA.

A. tuberosa (tuberous).* *fl.* bright orange, very showy; umbels disposed in a terminal sub-corymb. July to September. *l.* scattered, oblong-

lanceolate, hairy. Stems erectish, divaricately branched at top, very hairy. *h.* 1ft. to 2ft. North America (in stony, sandy fields and woods), 1690. A desirable hardy herbaceous border plant. See Fig. 158.

A. variegata (variegated). *fl.*, petals and foliola of corona white, fructification red, in dense umbels, very handsome; umbels almost sessile; pedicels hairy. July. *l.* opposite, ovate, petiolate, wrinkled, naked. Stems simple. erect, variegated with purple. *h.* 3ft. to 4ft. New York to Carolina (on dry, sandy hills), 1597.

A. verticillata (whorled). *fl.*, corolla with yellowish green petals and white nectaries; umbels many-flowered. July and August. *l.* very narrow, linear, thick, quite glabrous, usually verticillate, but sometimes scattered. Stems erect, often branched, having a downy line on one side. *h.* 1ft. to 2ft. New Jersey, 1759.

ASCYRON. *See* **Hypericum Ascyron**.

ASCYRUM (from *a*, without, and *skyros*, hard; that is to say, a plant which is soft to the touch). ORD. *Hypericinæ*. A genus of elegant little herbs and sub-shrubs, with sessile, entire leaves, destitute of pellucid dots, but usually furnished with black dots beneath. Flowers resembling *Hypericum*. They require to be protected during winter by a frame; for this

purpose they should be grown in pots, as they never exist long in the open border. A compost of peat, pure leaf soil, and sand, in equal portions, suits them well; young cuttings of the shrubby kinds will root in sand under a hand bell glass. Propagated by careful divisions of the roots in spring. All may be raised from seeds.

A. amplexicaule (stem-clasping). *fl.* yellow, few, axillary, and terminal; corymbs naked. July. *l.* stem-clasping, ovate, cordate, sinuately-curled. Stem dichotomously panicled. *h.* 2ft. North America, 1823. The flowers and leaves are longer in this than in any other of the species.

A. Crux Andreæ.* St. Andrew's Cross. *fl.*, petals narrow-pale, yellow, nearly sessile, in terminal corymbs. July. *l.* ovate-linear, obtuse, usually in bundles in the axils. Stem shrubby, round. *h.* 1ft. North America (in sandy fields), 1759. This proves to be quite hardy in many situations.

A. hypericoides (Hypericum-like). *fl.* yellow. August. *l.* linear-oblong, obtuse. *h.* 2ft. North America, 1759.

A. stans (standing). St. Peter's Wort. *fl.* yellow. August. *l.* oval or oblong, somewhat clasping. *h.* 2ft. North America, 1816.

ASHES. The earthy or mineral particles of

combustible substances, remaining after combustion. Ashes are amongst the most economical manures.

Vegetable Ashes are generally the best application for manuring boggy, cold, and, consequently, sour and unprofitable land, in quantities of about forty bushels per acre, thinly and evenly distributed. The annual exhaustion of salts from large crops of grain, roots, and grass, is from 180lb. to more than 250lb. per acre; and the aggregate of a few years will so far impoverish the soil in one or more of the principles necessary to sustain a luxuriant vegetation, that it will cease to yield remunerating returns. The ashes of vegetables consist of such elements as are always required for their perfect maturity, and it is evident they must furnish one of the best saline manures which can be supplied for their growth; they contain, in fact, every element, and generally in the right proportions, for insuring a full and rapid growth. Both gardener and farmer will therefore perceive the great value of Ashes to their crops.

Coal Ashes. The bituminous and anthracite coals afford Ashes, and, although inferior in quality to those made from wood and vegetables, are, like them, a valuable manure, and they should be applied to the land in a similar manner. If they contain many cinders, from not having been thoroughly burned, they are more suited to heavy than to light soils. Coal Ashes, if very fine, may be sprinkled half an inch deep on the surface, over peas and beans, &c., to preserve them from mice; they may also be used for garden and greenhouse walks, where bricks or tiles are absent, being tidy in appearance, and an excellent substitute for other and more expensive material.

Peat Ashes. Peat approaching to purity, when thrown

out of its bed and thoroughly dried, may be burned to an imperfect Ash, and when it does not reach this point, it will become thoroughly charred, and reduced to cinders. The process of burning should be as slow as possible. In either form, it is a valuable dressing for the soil.

ASH-TREE. *See* **Fraxinus**.

ASIATIC POISON BULB. *See* **Crinum asiaticum**.

ASIMINA (meaning unknown). ORD. *Anonaceæ*. Hardy shrubs, with oblong, cuneated, usually deciduous leaves. Flowers sometimes rising before the leaves, usually solitary and axillary. They thrive freely in a mixture of sand and peat. Propagated by layers put down in the autumn, or by seed, procured from their native country. Seedlings should be raised in pots, and sheltered in winter, until they have acquired a considerable size.



FIG. 159. FLOWERING BRANCH OF ASIMINA TRILOBA.

A. triloba (three-lobed).* *fl.* campanulate, the three outer petals pale purplish, and the three inner ones smaller, purplish on the outside as well as the inside at the base and apex, with the middle yellow, about 2in. diameter, produced between the upper leaves. May. *l.* oblong-cuneated, often acuminated, and, as well as the branches, smoothish. *h.* 10ft. Pennsylvania, 1736. A small tree or shrub. See Fig. 159.

ASKALLON (the Eschallot). *See* **Allium ascalonicum**.

ASPALATHUS (from *a*, not, and *spao*, to extract; in reference to the difficulty of extracting its thorns from a wound). Including *Sarcophyllus*. ORD. *Leguminosæ*. Shrubs or sub-shrubs, natives, with one exception, of the Cape of Good Hope. Flowers usually yellow, furnished with three bracteoles, or a leaf comprised of three leaflets. Leaves of three to five leaflets, disposed palmately, rarely pinnately, having scarcely any or very short petioles. All the species are pretty when in flower, and thrive in a mixture of loam, peat, and sand. Young cuttings of half-ripened wood will strike in April, in sand, under bell glasses, which must be wiped dry occasionally. But little water is needed. Over a hundred species are known; those introduced are very rarely seen in cultivation.

ASPARAGUS (from *a*, intensive, and *sparasso*, to tear; in reference to the strong prickles of some species). ORD. *Liliaceæ*. Erect or climbing herbs or shrubs, with very small scale-like leaves, and a profusion of numerous slender fascicled-needle,

rather spiny branchlets. Flowers axillary, inconspicuous. Fruit baccate. The indoor species will all thrive well in a warm greenhouse temperature, provided they have partial shade, a good supply of moisture at the roots, and are not kept too close, in a moderately rich sandy compost. The hardy species are propagated chiefly by seeds and divisions of the roots. Rich sandy loam is necessary, and otherwise they may be treated as ordinary perennials. Some of the species belonging to this genus are among the most elegant of foliage plants for cutting purposes. *A. decumbens* and *A. scandens* make excellent plants for Wardian cases, and may be cut in freely if they exceed their limits.

ASPARAGUS (*A. officinalis*) AS A VEGETABLE. The value and importance of this plant as a vegetable cannot be over-estimated; it is extensively grown, and, when properly managed, produces a fairly lucrative crop.

Soil and Bed. The first thing to be done in the preparation of an Asparagus bed to stand for any length of time, is to secure an efficient drainage; and on wet soils this is best effected by placing a layer of brick rubbish over the whole of the bottom, and connecting this with a drain. On gravelly or other soils which are drained naturally, of course, this is not needed; but if really good crops are a *desideratum*, water should not stand within 3ft. of the surface. In all cases, the ground must be dug to a depth of 18in., and, if stiff, a goodly amount of road sweepings, or other gritty materials, should be well mixed with the staple soil. Asparagus requires a good soil, neither too heavy nor too light.

Manuring. After the soil has been well trenched, and has lain long enough to settle down, a good dressing of manure—thoroughly rotted, and not too rank, at

the rate of from twenty to thirty tons to the acre, dug into the surface of the beds—will be found very beneficial. If possible, this should be introduced in January; and then, if the weather permits, the beds should be forked two or three times by the end of March, so as to render the soil as friable as possible. A very good manure, and one that is easily obtained, is common garden salt. This may be given annually to established beds. A moderate dressing should be applied just before growth commences in spring, but a little will do no harm at other times during the summer. It is best scattered on with the hand, and a showery day should be selected, as it will then soon disappear. Salt, besides acting as a manure, has also the properties of keeping the beds cool and moist in hot weather, and of preventing the growth of weeds.

Planting. Asparagus can be planted during March and April, the latter month being the best time for the work. The soil having been thoroughly prepared, the next point is to decide on the size of the beds; this depends on the size of garden, and the class of "grass" desired. When very large and fine stocks are the object in view, the best results will accrue if the plants are fully a yard apart each way; but this means a comparatively small crop. A good plan is to make the beds 3ft. wide, planting two rows, at a distance of 1ft. from each other, and allowing 18in. between each plant, placing them in alternate order. An 18in. alley should be allowed between the beds. The roots used for making the beds should be one year old, and fresh from the ground. In planting, pull out a wide drill with a hoe, or other tool, to the depth of about 3in. or 4in., and spread out the roots all round. Carefully shake the soil in amongst the roots, and, if dry, apply some water through a coarse-rosed watering pot, to settle the earth around

them. At intervals, as necessary, give other waterings till September, when they should be discontinued. At all times, keep the beds free from weeds, removing them by the hand to prevent injury to the crowns of the plants. If the ground is good, no liquid manure will be needed the first year. As soon as the foliage turns yellow, cut it off, cleanly rake over the beds, and leave till about January, when a top-dressing of from 1in. to 3in. of thoroughly rotted manure may be applied with advantage. At the end of February, rake off the bed all loose straw or other *debris*, and throw on them a little of the soil from the alleys, raking down, and finishing off the edges squarely and neatly. During this and succeeding years, apply liquid manure and clear water, from time to time, as required; and, provided the manure is not of too great strength, there is scarcely any limit to its application; but, in many instances, beds which have only received an annual dressing have given a good return. Each year they must be cut over and dressed as before described, but care must be taken to keep them flat on the surface, otherwise the plants will die out for want of moisture. When the produce appears, the beds should be kept cut over until the 20th of June, after which, cutting should cease, or they will be rendered comparatively unproductive. Cutting can commence the second or third year, or as soon as there is any "grass" worth taking. Several methods of growing these plants could be cited, but that which we have recommended will be found most satisfactory.

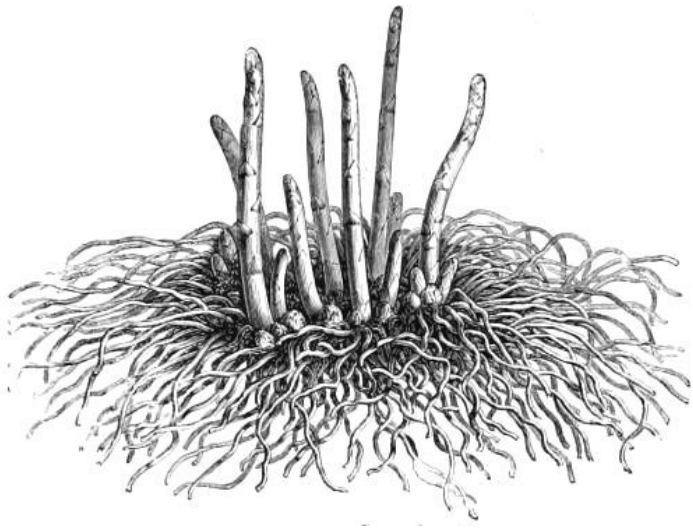


Fig. 160. Asparagus, Crown for Lifting.

Seeds. Plants are raised by sowing seeds in rows across the kitchen garden, or selected quarter, about the month of April. The seedlings make a growth, and form good plants during the first season. In March or April of the following year, or the year after, they may be removed, and planted out permanently, as already alluded to. Many cultivators prefer growing their own plants from seed; because during the transit of the roots from any distance to where they are to be grown, a frequent and injurious exhaustion takes place, and particularly so when they are carelessly packed.

Forcing. Asparagus can, if properly treated, be obtained from December onwards; and at Christmas time the produce is very valuable; but, in order to obtain it at this season, it will be necessary to resort to forcing. Prepare some beds to secure a lasting heat, and on these place about 3in. of ordinary garden soil, not very stiff. Then take the roots, and place them crown upwards, and moderately close

together, shaking the soil well amongst the roots, and covering about a couple of inches deep. Water well, to settle the whole, and put on the lights, allowing a little ventilation, to let out any steam which may arise. Unless the weather be very cold indeed, give a little air at all times, and only cover the lights in actual frost. From time to time, apply fresh linings of hot manure, and in cold rains, or wind, cover the outsides of the frames with old sacks, or other things which will keep in the heat. A regular and steady temperature of 60deg. will force this plant with better results than a higher one. Houses that are fitted with hot-water pipes to give bottom heat can be used equally as well as manure beds, and so long as the soil is kept moist, the heat thus obtained is as good as any for the purpose, and much less trouble than fermenting materials. To keep up a regular supply, a succession of beds will be necessary. Asparagus can be forced, or rather forwarded, in pots or boxes, in a warm greenhouse or vinery, and, of course, when the plants are done with, they can be cast away. We give an illustration (Fig. 160) of a bearing crown fit for gentle forcing; but, of course, it must not be left so bare of earth as appears here, which is done for the purpose of clearness.

Varieties. Connover's Colossal, and Giant, are the most esteemed. Strains are frequently largely advertised as improvements on the sorts above-mentioned, and the charges are higher accordingly. The difference may be generally attributed to the culture the plants receive more than to an improved variety. When saving seed for home sowing, they should be taken from the strongest growths, or deterioration will ensue.

A. æthiopicus ternifolius (ternate). *fl.* white, in shortly-stalked racemes, very profuse. August. *l.*, false ones in threes, flattened, narrow, linear; prickles solitary, reversed; branches angular. *h.* 30ft. South Africa, 1872. A greenhouse evergreen.

A. Broussoneti (Broussonet's).* *fl.* very small, succeeded by small red berries. May. *l.*, lower ones solitary, the others ternate, 1in. long, needle-shaped, persistent, distant, glaucescent; stipules with reflected spines at the base. Summer. Stem tapering, streaked, shrubby. *h.* 10ft. Canary Islands, 1822. A very pretty hardy climber.

A. Cooperi (Cooper's). *fl.* axillary, one to three, from the same nodes as the false leaves; perianth cream-coloured, one line long. April and May. *l.* minute, deltoid, scariose, reddish-brown; false leaves six to fifteen to a node, subulate, moderately firm, ¼in. to ⅜in. long, spreading or ascending. *h.* 10ft. to 12ft. Africa, 1862. A greenhouse climber, with a shrubby terete main stem, 1½in. to 2in. thick at the base, sending out crowds of spreading branches, which bear abundant slender, firm, alternate branchlets; nodes of branches and branchlets, furnished with distinct red-brown, subulate prickles, those of the main

stems ¼in. long, deflexed, but not curved.

A. decumbens (decumbent).* Stem unarmed, decumbent, much branched; branches wavy; leaves setaceous, in threes. Cape of Good Hope, 1792. A greenhouse evergreen herbaceous perennial.

A. falcatus (hooked-leaved). *l.* fascicled, linear, falcate; branches round; prickles solitary, recurved; peduncles one-flowered, clustered. *h.* 3ft. India, 1792. A greenhouse evergreen perennial.

A. officinalis (officinal). Common Asparagus. *fl.* greenish-white, drooping. August. *l.* setaceous, fasciculate, flexible, unarmed. Stem herbaceous, mostly erect, rounded, very much branched. *h.* 1ft. Said to grow on "Asparagus Island," Kynance Cove, Lizard, but we have never found it there, and it has probably long since been exterminated.

A. plumosus (plumed).* *fl.* white, small, produced from the tips of the branchlets. Spring. *l.*, true ones in the form of minute deltoid scales, with an acute ultimately reflexed point; the false ones are grouped in tufts, each being ⅛in. to ¼in. long, bristle-shaped, and finely pointed. South Africa, 1876. An elegant evergreen climber, with smooth stems and numerous spreading

branches. It forms an excellent plant when trained in pots, and is invaluable for cutting.

A. p. nanus (dwarf).* A very elegant dwarf variety of above. Stems tufted, slender, and gracefully arching. South Africa, 1880. For bouquets, the cut sprays of both type and variety have the advantage of much greater persistency than any fern, retaining their freshness in water from three to four weeks. See Fig. 161, for which we are indebted to Messrs. Veitch and Sons.

A. racemosus (racemose). *fl.* greenish-white, in many-flowered axillary racemes. May. *l.* bundled, linear-subulate, falcate; branches striated; prickles solitary. *h.* 3ft. India, 1808. Greenhouse evergreen shrub.



Fig. 161. Asparagus plumosus nanus.

A. ramosissimus (very branching). *fl.* solitary, at the tips of the branchlets; pedicels hardly perpendicular, one and a-half to two lines long; cream coloured. June. *l.* obscurely spurred at the base; false leaves three to eight-nate, flattened; linear-falcate acute, ¼in. to ⅜in. long, spreading. South Africa, 1862. A wide climbing, copiously branched, slender greenhouse shrub, with very numerous spreading or ascending branches and branchlets.

A. scandens (climbing).* *fl.* whitish, axillary on the ultimate branchlets, succeeded by round orange-coloured berries. The annual, much-branched, unarmed stems bear, usually in threes, numerous small linear-pointed leaves, which on the ultimate branches spread nearly in one plane. Cape of Good Hope, 1795. An elegant climbing greenhouse perennial.

A. virgatus (twiggy).* A remarkably elegant feathery looking plant, of shrubby habit. The stems, which issue from the crown of the stout fleshy roots, are of a dark green colour, and bear at the upper end a corymbose head of erect branches, of which the lowest is the youngest or most recently developed. These branches are again twice branched, the ultimate branchlets being

furnished with needle-shaped false leaves, ½in. long, which usually grow in threes. South Africa, 1862.

ASPARAGUS BEETLE (*Crioceris asparagi*), or "Cross-bearer." This beautiful little insect is blue-black or greenish; the thorax is red with two black spots, and the wing-cases are yellow, with a black cross on them; the legs and antennæ are black. The short grey larva is flat underneath, arched on the back, and covered with hairs. The sides are of an olive hue, and the little legs and head are black. It ejects a drop of blackish fluid from the mouth when touched. When full grown, which takes about a fortnight, the larva measures about two lines in length; the average length of the perfect Beetle is about three lines. Although this insect does not actually destroy the plants, it inflicts much damage on the foliage, and checks the growth of the stems after they have attained some size, in consequence of which the foliage becomes much less in the next season. The eggs are fixed to the shoots, and are small, dark, pointed bodies. The larvæ do the harm, as they feed on the bark and tender portions of the plants. The mature Beetles should be picked off by hand, and, by commencing early enough in the season, their numbers will be greatly reduced. Syringing the plants with water, heated to a temperature that will not injure the plants, is found a useful method for removing the grubs.

White Hellebore. Freshly-ground White Hellebore, sprinkled over the foliage while it is damp, and repeating the operation at intervals of about eight days for a season, will generally effect a riddance; but the following will usually be found better in such cases. Neither must be applied until after cutting

ceases, as they are very poisonous.

Paris Green. This, mixed and used as for Cherry Fly (*see* **Black Fly**), will generally got rid of the Beetle, if applied about thrice each season for two years. It should, however, only be used in severe cases.

Soot, applied in the same manner as White Hellebore, and in liberal quantities, will, in a season or two, clear the beds. If a bushel of salt be mixed with each twenty bushels of soot, it will enhance the effect.

ASPARAGUS KNIFE. The Asparagus Knife consists of a strong blade fixed in a handle. There are, or were, three kinds employed: In one form, the blade was blunt on both sides, straight, with a sharp tip, and not unlike a small chisel. Another had its blade slightly hooked, and serrated at one end. But the best is that now almost universally employed, and which is illustrated by Fig. 162.



FIG. 162. ASPARAGUS KNIFE.

ASPASIA (from *aspazomai*, I embrace; the column embraced by the labellum). ORD. *Orchidaceæ*. A genus of elegant stove Epidendrum-like epiphytal orchids, with the lip united to the column, and broad, thin pseudo-bulbs. The name Aspasia is now and then met with attached to a totally different genus. Salisbury gave it to a liliaceous plant which is now referred to *Ornithogalum*. For culture and propagation, *see* **Stanhopea**.

A. epidendroides (Epidendrum-like).* *fl.* whitish yellow; sepals linear oblong, acute; petals obtuse, concave, lateral lobes of lip

roundish, entire, middle lobe crenated emarginate. February. Pseudo-bulbs oblong, two-edged. *h.* 1ft. Panama, 1833.

A. lunata (crescent-marked).* *fl.* green, white, and brown, solitary; sepals and petals linear obtuse, spreading; lip three-lobed, lateral lobes short, middle one flat, nearly square, wavy. February. Pseudo-bulbs oblong, two-edged. *h.* 1ft. Rio Janeiro, 1843.

A. papilionacea (butterfly-like).* *fl.*, sepals and petals yellowish, mottled with brown lines on their internal inferior halves; lip fiddle-shape, its back very great, elliptic, apiculate; an orange-coloured area stands at its base, a wide violet disc before and around it. *h.* 9in. Costa Rica, 1876. Distinguished from *A. lunata* in having thirteen keels at the base of the lip, which is higher inserted, and in the echinulate anther. It is a beautiful but rare novelty.

A. psittacina (parrot-like).* *fl.*, sepals and petals light green, with brown transverse bars, which sometimes consist of separate stripes, at other times of confluent ones; the fiddle-shaped lip shows two keels and a few purplish dots over its top; the column is brown at its top, then violet, and white at the base. Ecuador, 1878. It has a raceme

of several flowers, usually one-sided, bent over.

A. variegata (variegated).* *fl.* green, spotted with yellowish red; sepals linear oblong; petals somewhat rhomboid, acute; lateral lobes of lip recurved, middle one fleshy, serrated. February. *h.* 9in. Panama, 1836. Deliciously sweet-scented in the morning.

ASPEN. *See* **Populus tremula**.

ASPERA. Rough, with hairs or points.

ASPERULA (from *asper*, rough; in allusion to the leaves). Woodruff. ORD. *Rubiaceæ*. Hardy herbs, rarely small shrubs. Flowers terminal and axillary, in fascicles. Leaves opposite, with one, two, or three stipulas on each side; they are therefore called four to eight in a whorl, but between the uppermost leaves there are no stipulas. Stems and branches usually tetragonal. Most of the species are very pretty when in flower, and are, therefore, well adapted for borders, rockwork, and shady places, in almost any garden soil. Propagated by divisions of the roots during spring and early summer. Herbaceous perennials, except where otherwise stated.

A. azurea-setosa (blue-bristly). A synonym of *A. orientalis*.

A. calabrica (Calabrian). A synonym of *Putoria calabrica*.

A. cynanchica (Cynanche-like). *fl.* on erect branches, forming a

fastigiate corymb, white or bluish-coloured, elegantly marked with red lines, or sometimes pure white. Summer. *l.* four in a whorl; floral ones lanceolate-linear, acuminately awned; lower ones small, oblong, upper ones opposite. Plant glabrous, erectish. *h.* 9in. to 12in. England.

A. hirta (hairy). *fl.* white at first, changing to pink, with oblong divisions. July and August. *l.* usually six in a whorl, four towards the upper part, linear, hairy, deep green. *h.* 3in. Pyrenees, 1817. A charming but rare little alpine, thriving best in a rather damp position on the rockery.

A. longiflora (long-flowered).* *fl.* whitish, yellowish inside, and reddish outside; tube of corolla elongated; fascicles terminal, pedunculate; bracteas small, subulate. Summer. *l.* four in a whorl, linear; lower ones small, obovate; upper ones opposite. Stems weak, numerous, from the same neck, erectish, glabrous. *h.* 6in. Hungary, 1821.

A. montana (mountain).* *fl.*, corollas pink, four-cleft, scabrous externally; in fascicles. June, July. *l.* linear; lower ones six in a whorl; middle ones four; upper ones opposite; floral leaves linear. Stem weak, glabrous. *h.* 6in. to 8in.

Hungary, 1801.

A. odorata (sweet-scented).* Sweet Woodruff. *fl.* snowy white; corymbs terminal, pedunculate, usually trifid, each division bearing about four flowers. May, June. *l.* eight in a whorl, lanceolate, smooth, with serrulately scabrous edges. Stems tetragonal, simple, erect, or ascending. *h.* 6in. to 12in. Britain. This very pretty little plant is scentless when fresh, but, when dried, it diffuses an odour like that of spring grass; and when kept among clothes, it not only imparts an agreeable perfume to them, but preserves them from insects.

A. orientalis (Oriental).* *fl.* sky blue, in terminal heads; bracts of involucre shorter than the flowers. Summer. *l.* lanceolate, bristly, about eight in a whorl. *h.* 1ft. Caucasus, 1867. A charming little, profuse blooming, hardy annual, bearing clusters of fragrant flowers, admirably adapted for bouquet making. SYN. *A. azurea-setosa*. See Fig. 163.

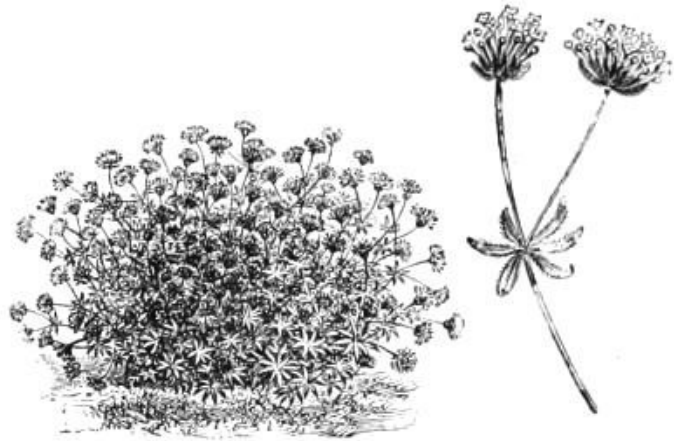


Fig. 163. Asperula Orientalis, showing Habit and Portion of Inflorescence.

A. taurina (bull). *fl.*, corollas white, elongated; corymbs pedunculate, axillary, fasciculately umbellate, involucrated; bracteas ciliated. April to June. *l.* four in a whorl, ovate-lanceolate, three-nerved, with finely ciliated margins. Plant smoothish, erect. *h.* 1ft. South Europe, 1739.

A. tinctoria (Dyers'). *fl.* white, reddish on the outside; usually trifid. June. *l.* linear; lower ones six in a whorl; middle ones four; and the uppermost ones opposite; floral leaves ovate. Plant procumbent, unless supported. Stem 1ft. to 2ft. long, purplish. Europe, 1764.

ASPHALT. Artificial Asphalt is now generally used in England for footpaths, &c. The recipes are various, one of the best being the following: Lime rubbish two parts, coal ashes one part (both must be very

dry), sifted very fine; mix them, and leave a hole in the middle of the heap, wherein pour boiling hot coal tar; mix well together. When as stiff as mortar, lay it down, 3in. thick, on a dry and previously well-levelled surface. A boy should follow with dry, finely-sifted sand, distributing just enough to prevent his boots sticking to the tar. Two men should be employed for the tarring, whilst another should attend to the boiling operation. Only just enough tar to last ten minutes must be taken from the furnace at one time, as, if it be not boiling, the walks will become soft under the action of very hot sun. This may be repeated every three years. It is imperative that the surface, lime, coal ashes and sand be perfectly dry, and that the days selected for the operation be very fine, the hotter the better. Another excellent plan is that of using gas lime and coal ashes. There must be a firm foundation and smooth surface. Spread the gas lime to about 1½in. deep, and level with the back of a spade. Over this place a thin layer of coal dust, and well roll. The work is then complete.

ASPHODEL. *See* **Asphodelus**.

ASPHODELINE. ORD. *Liliaceæ*. A genus of plants allied to *Asphodelus*, but distinguished from it by having erect leafy stems. They thrive in any ordinary garden soil. Propagated by division.

A. brevicaulis (short-stemmed). *fl.* in lax, often panicled racemes, yellow, veined with green. *l.* subulate, ascending, lower ones 4in. to 6in. long. Stem slender, often flexuose. Orient.

A. damascena (Damascene). *fl.*

white, in dense generally simple racemes, 6in. to 12in. long. *l.* in dense rosette, 6in. to 9in. long, subulate. Stem simple, erect. *h.* 1½ft. to 2ft. Asia Minor.

A. liburnica (Liburnian). *fl.* yellow, striped with green, in generally simple lax racemes, 6in. to 9in. long. Stem simple, erect, strict, 1ft. to 2ft. high, upper half naked. South Europe.

A. lutea (yellow). *fl.* yellow, fragrant, in a dense, very long, straight, simple raceme, in the axils of buff-coloured bracts, which are nearly as long as the flowers. Summer. *l.* numerous, awl-shaped, triangular, furrowed, smooth, dark green, marked with lines of a paler tint; root leaves tufted. Stem 3ft. or 4ft. high. Sicily, 1596. The best known and handsomest species. SYN. *Asphodelus luteus*.

A. l. fl.-pl. This resembles the species, but the flowers are double, and last much longer than those of the typical form; it is a very pretty plant.

A. taurica (Taurian). *fl.* white, striped with green, in generally simple dense racemes, 6in. to 12in. long, 1in. to 2in. wide. Stem simple, erect, 1ft. to 2ft. high, densely leafy at base of raceme. Asia Minor, &c.

SYN. *Asphodelus tauricus*.

A. tenuior (slenderer). *fl.* yellow, in simple lax-flowered racemes, 3in. to 4in. long, 2in. wide. Stem simple lower half leaf, upper naked, 1ft. Orient. SYN. *Asphodelus tenuior*.

ASPHODELUS (from *a*, not, and *sphallo*, to supplant; in allusion to the beauty of the flowers). Asphodel. ORD. *Liliaceæ*. Very pretty hardy herbaceous perennials, with fleshy fasciculated roots. Perianth white or yellow, of six equal spreading segments; stamens six, hypogynous, alternately long and short. Leaves usually radical, tufted, narrow, or triquetrous. All the species enumerated thrive in good deep sandy loam, and are very suitable for borders and shrubberies. Propagated by division of the root, which is best done in early spring.

A. æstivus (summer). *fl.* white. Summer. *h.* 2ft. Spain, 1820.

A. albus (white).* *fl.* white; peduncles clustered the length of the bracts. May. *l.* linear, keeled, smooth. Stem naked, simple. *h.* 2ft. South Europe, 1596.

A. creticus (Cretan).* *fl.* yellow. July. *l.* filiform, striated, toothed, ciliated. Stem leafy, naked above, branched. *h.* 2ft. Crete, 1821.

A. fistulosus (pipe-stalked). *fl.* white. July, August. *l.* upright, striated, subulate, fistular. Stem naked. *h.* 18in. South Europe, 1596.

A. luteus (yellow). A synonym of *Asphodeline lutea*.

A. ramosus (branchy). *fl.* large, white, with a reddish-brown line in the middle of each segment, springing from the axils of ovate-lanceolate bracts, and in very long dense racemes. Summer. *l.* sword-shaped, stiff, sharply keeled below, channelled above. Stem much branched. *h.* 4ft. to 5ft. South Europe, 1829.



Fig. 164. Asphodelus Villarsii, showing Habit and Flower.

A. Villarsii (Villars'). *fl.* white; raceme dense, elongated; bracts dark brown. Stem simple or rarely branched. *h.* 1ft. to 2ft. Eastern

France. See Fig. 164.

ASPIDISTRA (from *aspidiseon*, a little round shield; in reference to the form of the flower). SYN. *Porpax* (of Salisbury). Including *Plectogyne*. ORD. *Liliaceæ*. Hardy, or nearly hardy, evergreen, foliage plants. Flowers insignificant, produced close to the ground, remarkable for the curious mushroom-like stigma, by which this genus is characterised. They thrive in almost any ordinary garden soil, but are best grown in rich loam, leaf soil, and sand; plenty of moisture being allowed. Propagated by suckers.

A. elatior (taller).* *l.* oblong, large, on long petioles, leathery; plant stemless. *h.* 1½ft. to 2ft. Japan, 1835. This very easily cultivated and quite hardy foliage plant is much grown for window gardening and other decorative purposes, for which it is well suited.

A. e. variegata (variegated).* A fine variety with alternately-striped green and white leaves.



Fig. 165. Aspidistra lurida.

A. lurida (lurid). *fl.* purple. July. *l.* oblong-lanceolate, on long petioles. *h.* 1ft. to 1½ft. China, 1822. A very graceful species, with long evergreen leaves. It is an effective plant for the outdoor garden during summer, and is nearly, if not quite, hardy. See Fig. 165.

A. punctata (dotted). *l.* lanceolate, on long stalks. *h.* 1ft. China. This is very closely allied to *A. elatior*, but of inferior value.

ASPIDIUM (from *aspidion*, a little buckler; in allusion to the form of the involucre). Shield Fern. Ord. *Filices*. Including *Cyclodium*, *Cyclopeltis*, *Cyrtomium*, *Phanerophlebia*, and *Polystichum*. Stove, greenhouse, or hardy ferns. Sori sub-globose, dorsal or terminal on the veinlets; involucre orbicular, fixed by the centre. They thrive in a compost of sandy peat with a

little loam. Several species are admirably adapted for the indoor fernery. The hardy species are best grown in the shade; a little sandstone should be incorporated with the soil. For general culture, *see* **Ferns**.

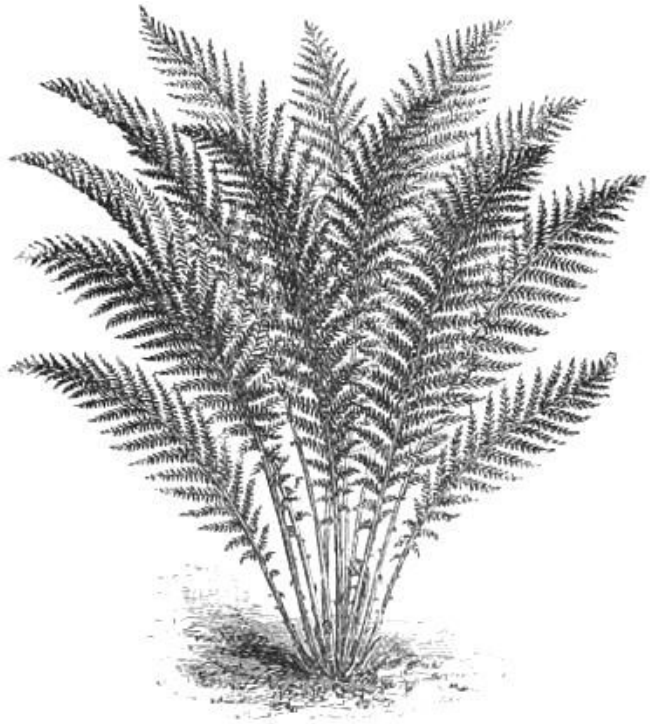


Fig. 166. Aspidium aculeatum.

A. acrostichoides (Acrostichum-like).* *sti.* 6in. to 8in. long, densely scaly below. *fronds* 1ft. to 2ft. long, 2in. to 6in. broad; pinnæ of the lower half barren, 2in. to 3in. long, ¼in. broad, spinoso-serrated throughout, auricled at the base above; the pinnæ of the upper half

fertile, much smaller. *sori* occupying the whole under side. North America. SYN. *Polystichum acrostichoides*. Hardy.

A. a. grandiceps (large-crested).* A very handsome fern, having the apices of the fronds and pinnæ heavily crested; equally desirable for the hardy or temperate fernery. Of garden origin.

A. a. incisum (incised).* A variety with the pinnules deeply cut and acutely pointed.

A. aculeatum (sharp-pointed).* The Hard Shield Fern. *sti.* tufted, 6in. to 12in. long, more or less scaly. *fronds* 1ft. to 3ft. long, 6in. to 12in. broad, ovate-lanceolate; lower pinnæ close, lanceolate, 4in. to 6in. long, ½in. to ¾in. broad; pinnules ovate-rhomboidal, unequal sided, auricled on the upper base; teeth aristate. sori nearer the midrib than the edge. A variable and hardy species, common throughout the world. SYN. *Polystichum aculeatum*. *A. a. proliferum* is a proliferous Australian form. *A. a. vestitum* has the rachis densely clothed to the point, both with reddish-brown fibrillose and large lanceolate dark brown scales. See Fig. 166.

A. amabile (lovely). *sti.* scattered, 6in. to 12in. long, slightly scaly below. *fronds* 1ft. or more long, 6in.

to 12in. broad, with a lanceolate terminal pinna, and three to six lateral ones on each side, which are 3in. to 6in. long, 1in. to 1½in. broad, the lowest sometimes divided at the base; segments sub-rhomboidal, with at least half the lower side cut away, the upper side and part of the lower lobed and sharply spinuloso-serrated. sori sub-marginal. Ceylon. Stove species. SYN. *Polystichum amabile*.

A. angulare (angular). The Soft Shield Fern. Botanically this is only a variety of *A. aculeatum*; but, to the cultivator, it is abundantly distinct. The fronds are not so tapered at the base, the pinnules are more equal in size, and the lower ones distinctly stalked, while the texture is much less rigid than in *A. aculeatum*, the caudex has a tendency to elongate. Almost cosmopolitan in its distribution. SYN. *Polystichum angulare*. There are an enormous number of varieties, many of which are not under cultivation. Amongst the best found in gardens are *alatum*, *Bayliæ*, *concinnum*, *corymbiferum*, *cristatum*, *curtum*, *dissimile*, *grandiceps*, *imbricatum*, *Kitsoniæ*, *lineare*, *parvissimum*, *plumosum*, *polydactylon*, *proliferum*, *rotundatum*, *Wakeleyanum*, *Woollastoni*.



FIG. 167. ASPIDIUM ANGULARE GRANDICEPS.

A. a. grandiceps (large-crested). This is a narrow fronded variety, having the apices of the fronds branched and crested, ultimately producing a broad tasselled head. A very handsome fern. See Fig. 167.

A. anomalum (anomalous). *sti.* tufted, 1ft. to 2ft. long, densely scaly below. *fronds* 2ft. to 3ft. long, 1ft. or more broad; lower pinnæ 6in. to 9in. long, 2in. to 3in. broad; pinnules lanceolate, cut down in the lower part into oblong segments; teeth blunt or slightly mucronate. *sori* placed near the sinuses of the

pinnules. Ceylon. Stove species. SYN. *Polystichum anomalum*.

A. aristatum (awned).* *rhiz.* creeping. *sti.* scattered, 9in. to 18in. long, very scaly below. *fronds* 1ft. to 2ft. long, 9in. to 12in. broad, ovate-deltoid, tri- or quadripinnatifid; lower pinnæ largest, 4in. to 6in. long, 2in. to 3in. broad; lowest pinnules much the largest, lanceolate-deltoid; teeth copious aristate. *sori* small, principally in two rows near the midrib. Japan, Himalayas, New South Wales, &c. Greenhouse species. SYN. *Polystichum aristatum*.

A. a. coniifolium (Conium-leaved).* *fronds* more finely divided; segments copiously toothed, with lower lobes distinct.

A. a. variegatum (variegated).* A handsome variety, with a broad band of green running through the bases of the pinnules along the course of the rachis.

A. auriculatum (eared).* *sti.* tufted, 4in. to 6in. long, scaly below or throughout. *fronds* 12in. to 18in. long, 2in. to 4in. broad; pinnæ numerous, sub-sessile, usually close, 1in. to 2in. long, about ½in. broad, ovate-rhomboidal, falcate, acute, spinoso-serrated, the upper base auricled, the lower one truncate. *sori* in two rows. India, widely

distributed. Stove species. SYNS. *A. ocellatum*, *Polystichum auriculatum*.

A. a. lentum (pliant). Pinnæ cut into oblong mucronate lobes about half-way down to the rachis, the auricle sometimes quite free.

A. a. marginatum (margined).* A variety with more coriaceous texture; upper edge of the pinnæ slightly lobed.

A. capense (Cape).* *sti.* scattered, 1ft. to 2ft. long, densely scaly below. *fronds* 1ft. to 3ft. long, 12in. to 18in. broad, sub-deltoid; lowest pinnæ the largest, 6in. to 9in. long, 3in. to 4in. broad; pinnules and segments lanceolate, the latter bluntly lobed. *sori* very large and copious. South America, New Zealand, Cape Colony, Natal, &c. Greenhouse species. SYNS. *A. coriaceum*, *Polystichum capense*.

A. confertum (compressed). Synonymous with *A. meniscioides*.

A. coriaceum (leathery). Synonymous with *A. capense*.

A. falcatum (hooked).* *sti.* tufted, 6in. to 12in. long, densely scaly below. *fronds* 1ft. to 2ft. long, 6in. to 9in. broad, simply pinnate; pinnæ numerous, the lower stalked, ovate-acuminate, falcate, 3in. to 5in. long, 1in. to 2in. broad; edge entire or slightly undulated, the upper side narrowed suddenly, sometimes

auricled, the lower rounded or obliquely truncate at the base. *sori* small, copious, scattered. Japan, China, Himalayas, &c. SYN. *Cyrtomium falcatum*.

A. f. caryotideum (Caryota-like) has pinnæ sometimes larger, sharply toothed, slightly lobed, sometimes auricled on both sides. SYN. *Cyrtomium caryotideum*.

A. f. Fortunei (Fortune's).* This differs from the type in having pinnæ narrower and more opaque. All are most useful house ferns, and quite hardy in many parts of the country. SYN. *Cyrtomium Fortunei*.

A. falcinellum (finely-hooked).* *sti.* tufted, 4in. to 8in. long, densely scaly. *fronds* 9in. to 18in. long, 3in. to 6in. broad; central pinnæ 2in. to 3in. long, ¼in. broad; point acute; edge finely serrated; the upper side bluntly auricled, the lower obliquely truncate at the base. *sori* in two long rows. Madeira. Greenhouse species. SYN. *Polystichum falcinellum*.

A. flexum (bending). *rhiz.* stout, wide-creeping. *sti.* scattered, 1ft. long, scaly. *fronds* 2ft. to 3ft. long, 9in. to 12in. broad; lower pinnæ lanceolate-deltoid, 4in. to 6in. long, 2in. to 4in. broad; pinnules lanceolate-deltoid, cut down to the rachis below into oblong bluntly-lobed segments. *sori* large, in two

rows, copious. Juan Fernandez. Stove species. SYN. *Polystichum flexum*.

A. fœniculaceum (Fennel-leaved).* *rhiz.* creeping. *sti.* scattered, 6in. to 12in. long, densely scaly below. *fronds* 1ft. to 2ft. long, and 9in. to 12in. broad, lanceolate-deltoid, four to five pinnatifid; lower pinnæ 6in. to 8in. long, 3in. to 4in. broad; ultimate divisions linear, awned, with a firm texture. *sori* solitary. Greenhouse species. Sikkim, 7,000ft. to 10,000ft. SYN. *Polystichum fœniculaceum*.

A. frondosum (leafy). *sti.* scattered, 1ft. to 2ft. long, densely scaly below. *fronds* 18in. to 24in. long, 1ft. or more broad, sub-deltoid; lower pinnæ much the largest, long stalked; pinnules lanceolate; segments very unequal sided, pinnatifid, with rounded mucronate lobes, obliquely truncate at the base below. *sori* large, copious. Madeira. Greenhouse species. SYN. *Polystichum frondosum*.

A. Hookeri (Hooker's). *sti.* 1ft. or more long, naked. *fronds* 2ft. to 3ft. long; pinnæ 6in. to 8in. long, 1in. broad, cut down to a broadly-winged rachis into nearly close, spreading, entire, linear-oblong lobes ⅛in. broad. *sori* nearer the edge than the midrib. Malay Archipelago. Stove

species. SYNS. *A. nephrodioides* and *Cyclodium Hookeri*.

A. laserpitiifolium (Laserpitium-leaved).* *sti.* 4in. to 6in. long, stramineous, scaly at base. *fronds* 12in. to 18in. long, 6in. to 9in. broad, ovate-deltoid, tripinnate; lower pinnæ the largest, with pinnules on the lower side prolonged, lanceolate, imbricated with small, distinct, bluntly-lobed segments. *sori* in two rows, very copious. Japan. A very desirable greenhouse species. SYNS. *Lastrea Standishii* (of gardens) and *Polystichum laserpitiifolium*.

A. lepidocaulon (scaly-stemmed). *sti.* tufted, 6in. to 9in. long, densely clothed with large cordate scales. *fronds* 1ft. or more long, 4in. to 6in. broad, sometimes elongated and rooting at the point: pinnæ 2in. to 3in. long, ½in. to ¾in. broad, lanceolate-falcate, the two sides unequal, the upper one auricled at the base. *sori* principally in two rows, near the midrib. Japan. Greenhouse species. SYN. *Polystichum lepidocaulon*.

A. Lonchitis (spar-like).* The Holly Fern. *sti.* densely tufted, 1in. to 4in. long, scaly at base. *fronds* 1ft. to 2ft. long, 1in. to 3in. broad, pinnate throughout; pinnæ ½in. to 1½in. long, ¼in. to ½in. broad, ovate-

rhomboidal, sub-falcate, the two sides unequal, point mucronate, edge spinuloso-serrated, the upper side sharply auricled at the base, the lower obliquely truncate. Britain, &c. A very widely-spread hardy species. SYN. *Polystichum Lonchitis*.

A. meniscioides (Meniscium-like). *sti.* 1ft. to 2ft. long, scaly below. *fronds* 2ft. to 3ft. long, 1ft. or more broad, pinnate; barren pinnæ sessile, 6in. to 9in. long, 1½in. to 2in. broad, oblong-acuminate, nearly entire; fertile pinnæ much smaller. *sori* in two close rows between the primary veins. West Indies, &c. Stove species. SYNS. *A. confertum* and *Cyclodium meniscioides*.

A. mohrioides (Mohria-like). *sti.* tufted, 2in. to 6in. long, more or less densely scaly. *fronds* 6in. to 12in. long, 2in. to 3in. broad, bipinnate; pinnæ numerous, frequently imbricated, lanceolate, cut down below into slightly toothed, oblong-rhomboidal pinnules. *sori* copious. Patagonia and the Cordilleras of Chili. Greenhouse species. SYN. *Polystichum mohrioides*.

A. mucronatum (mucronated).* *sti.* tufted, 2in. to 4in. long, densely scaly. *fronds* 12in. to 18in. long, 1½in. to 2in. broad, pinnate throughout; pinnæ very numerous, often imbricated, ¾in. to 1in. long,

¼in. to broad, sub-rhomboidal, unequal-sided, mucronate, sub-entire, distinctly auricled at the upper base. *sori* in a long row on each side the midrib. West Indies. Stove or greenhouse species. SYN. *Polystichum mucronatum*.

A. munitum (armed).* *sti.* tufted, 4in. to 9in. long, densely scaly. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad; pinnæ close, 2in. to 4in. long, about ½in. broad, acuminate, finely spinulose and serrated throughout, the upper side auricled, and the lower obliquely truncate at the base. *sori* in two rows near the edge. California, &c. Hardy; very fine. SYN. *Polystichum munitum*.

A. nephrodioides (Nephrodium-like). Synonymous with *A. Hookeri*.

A. ocellatum (spotted). Synonymous with *A. auriculatum*.

A. pungens (stinging). *rhiz.* stout. *sti.* scattered, 1ft. long, scaly below only. *fronds* 2ft. to 3ft. long, 9in. to 12in. broad; lower pinnæ 4in. to 6in. long, 2in. to 3in. broad; pinnules ovate-rhomboidal, unequal-sided, often deeply pinnatifid. *sori* principally in two rows near the midrib. Cape Colony. Greenhouse species. SYN. *Polystichum pungens*.

A. repandum (wavy-leaved). *sti.* 1ft. to 2ft. long, naked. *fronds* 2ft. or

more long, 12in. to 18in. broad, apex deeply pinnatifid, with linear-oblong, slightly sinuated lobes; lower pinnæ four to eight on each side, 6in. to 8in. long, 1¼in. to 1½in. broad, acuminate; edge bluntly sinuated, the lowest stalked and forked. *sori* in two distinct rows near the main vein. Philippines. Stove species.

A. rhizophyllum (frond-rooting). *sti.* tufted, 1in. to 2in. long, slender. *fronds* 2in. to 6in. long, ¾in. broad, with the long, narrow upper half of the frond lengthened out and rooting, the lower half cut down to a flattened fibrillose rachis into oblong-rhomboidal sub-entire lobes about ½in. broad, ¼in. deep. *sori* scattered. Jamaica, 1820. Stove or cool house species. SYN. *Polystichum rhizophyllum*.

A. semicordatum (half-cordate). *sti.* scattered, 6in. to 12in. long. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad, simply pinnate; pinnæ spreading, 4in. to 6in. long, ½in. to ¾in. broad, nearly entire, acuminate, cordate or truncate at the base. *sori* in one to three rows on each side, the inner one close to the midrib. Tropical America, &c. SYN. *Polystichum semicordatum*.

A. trapezioides (Trapezium-like). Synonymous with *A. viviparum*.

A. triangulum (triangular).* *sti.* tufted, 2in. to 6in. long, base scaly. *fronds* 1ft. or more long, 1½in. to 2in. broad; pinnæ numerous, sessile, lower ones distant, central ones ¾in. to 1in. long, about ⅝in. broad, subdeltoid, lower side obliquely truncate; apex mucronate, edge subentire or slightly lobed, with blunt or spinose teeth, one or both sides auricled at the base. *sori* principally in two rows near the edge. West Indies. Stove or greenhouse species. SYN. *Polystichum triangulum*.

A. trifoliatum (three-leaved). *sti.* tufted, 1ft. or more long, base only scaly. *fronds* 12in. to 18in. long, 6in. to 12in. broad, with a large ovate-acuminate terminal pinna, narrowed or forked at the base, and one or two lateral ones on each side, the lowest mostly forked. *sori* in rows near the main veins. Tropical America. Stove species.

A. t. heracleifolium (Heracleum-leaved). A form with pinnæ pinnatifid on both sides at the base.

A. tripteron (three-winged). *sti.* 6in. to 9in. long, densely scaly at base. *fronds* 12in. to 18in. long, with a large terminal and two small spreading lateral pinnæ at the base of it, the former 2½ in. to 3in. broad, with very numerous spreading pinnules on each side,

1½in. long, about ½in. broad, unequal sided, acute, deeply inciso-pinnatifid, the lower lobes again toothed; lateral pinnæ 3in. to 5in. long, 1½in. to 2in. broad. *sori* principally in two rows midway between midrib and edge. Japan. Greenhouse species. SYN. *Polystichum tripteron*.

A. varium (variable).* *rhiz.* sub-creeping. *sti.* 6in. to 12in. long, densely fibrillose below. *fronds* 12in. to 18in. long, 9in. to 12in. broad, lanceolate-deltoid; lower pinnæ much the largest, sub-deltoid, unequal sided, 4in. to 6in. long, 3in. to 4in. broad; pinnules lanceolate, imbricated, with oblong, blunt, slightly toothed segments. *sori* principally in two rows near the midrib. Japan. Greenhouse species. SYNS. *Lastrea varia* and *Polystichum varium*. It is frequently met with in gardens under the former name.

A. viviparum (bud-producing). *sti.* tufted, 4in. to 6in. long, scaly at the base. *fronds* 12in. to 18in. long, 4in. to 6in. broad; pinnæ numerous, nearly lanceolate, the central ones 2in. to 3in. long, about ½in. broad, mucronate, sometimes bud-bearing, the edge more or less deeply lobed, in the lower part sometimes quite down to the rachis, the upper side auricled. *sori* in two or four rows.

West Indies. Stove or greenhouse species. SYNS. *A. trapezioides* and *Polystichum viviparum*.

ASPLENIUM (from *a*, not, and *splen*, spleen; referring to the medicinal properties formerly attributed to the genus). Spleenwort. ORD. *Filices*. Including *Anisogonium*, *Athyrium*, *Ceterach*, *Cænopteris*, *Darea*, *Diplazium*, *Hemidictyum*, *Neottopteris*. A very large and widely-spread genus, including species suitable for the stove, temperate, and hardy ferneries. Sori dorsal or submarginal, linear or oblong. Involucre similar in shape, straight or occasionally curved, single or double, plane or tumid, bursting along the outer edge. The tropical species should be grown in a compost of peat, loam, and sand; the hardy sorts in a mixture of fibrous peat and sand. Good drainage is at all times required. For general culture, *see* **Ferns**.



Fig. 163. Asplenium Adiantum-nigrum, showing Rootstock and back of Fertile Fronds.

A. abscissum (clipped). *sti.* tufted, 4in. to 8in. long. *fronds* 6in. to 12in. long, 3in. to 4in. broad, sometimes proliferous at the apex, with twelve to twenty horizontal pinnæ on each side, which are 1½in. to 2in. long,

about ½in. broad, bluntish; edge inciso-crenate, the upper one narrowed suddenly at the base, the lower one obliquely truncate. *sori* short, in two regular rows, falling short of both midrib and edge. Tropical America. Stove species. SYN. *A. firmum*.

A. acuminatum (taper-pointed).* *sti.* 6in. to 9in. long. *fronds* 1ft. to 2ft. long, 9in. to 12in. broad, with very numerous close-placed lanceolate-oblong pinnæ on both sides, which are 4in. to 6in. long, 1½in. to 2in. broad; pinnules numerous, unequal-sided, lanceolate, acuminate; edges sharply toothed, the lower base obliquely truncate. *sori* in two rows in the upper part, of the pinnules, often diplazioid. Sandwich Islands. Greenhouse species. SYN. *A. polyphyllum*.

A. Adiantum-nigrum (Black Spleenwort). *sti.* tufted, 6in. to 9in. long. *fronds* 6in. to 12in. long, 4in. to 6in. broad sub-deltoid; lower pinnæ deltoid, 2in. to 3in. long, 1½in. to 2in. broad; all the pinnæ pinnate. *sori* copious, at last often occupying the whole under surface of the segments. Great Britain. World-wide in its distribution. Hardy. *A. solidum*, from Cape Colony, is supposed to be a mere form of this species. There are

several varieties the best of which are described below. See Fig. 168.

A. A.-n. acutum (acute). *fronds* 9in. to 15in. long, deltoid, tripinnate; ultimate segments linear, and very acute. Ireland. A copiously divided and very elegant variety. Habit more graceful than the type.



Fig. 169. Asplenium Adiantum-nigrum grandiceps.

A. A.-n. grandiceps (large-crested). *fronds* 6in. to 12in. long; pinnæ comparatively short, and slightly crested; apex freely divided, and expanded into a broad crest, which gives the frond a very graceful contour. Frame or greenhouse variety. See Fig. 169.

A. A-n. oxyphyllum (sharp-leaved).

fronds 4in. to 6in. long, ovate-lanceolate; ultimate segments narrow and very acute. A very pretty little variety.

A. affine (related). *sti.* 6in. to 12in. long. *fronds* 12in to 18in. long, 6in. to 12in. broad, bipinnate, with numerous pinnæ on each side, the lower ones lanceolate-rhomboidal; pinnules rhomboidal, inciso-serrate. *sori* copious, linear. Mascaren Islands, &c. Stove or warm greenhouse species. SYN. *A. spathulinum*.

A. alatum (winged).* *sti.* 4in. to 6in, long, slender, the upper part and the rachis, winged. *fronds* 1ft. to 1½ft. long, 3in. to 4in. broad, with twelve to twenty horizontal sessile pinnæ on each side, which are 1in. to 1½in. long, and about ½in. broad, bluntish; edge uniformly inciso-crenate, the base nearly equal on both sides. *sori* distant, not reaching either the midrib or edge. West Indies, &c. A very elegant stove species.

A. alismæfolium (Alisma-leaved). *sti.* 2in. to 6in. long. *fronds* varying in shape, from simple oblong-lanceolate, 6in. to 9in. long, 2in. to 3in. broad; apex acuminate; edges entire, to ternate or pinnate, with a large terminal and three pairs of lateral pinnæ, each like the entire

frond of the simple state; texture coriaceous. Isle of Luzon. Stove species. SYN. *Anisogonium alismæfolium*.

A. alternans (alternated). *sti.* tufted, 1in. to 2in. long. *fronds* 6in. to 8in. long, 1in. to 1½in. broad, lanceolate-oblong, cut down into numerous bluntly-rounded lobes on each side, which reach very nearly down to the rachis, the lower gradually reduced. *sori* copious. N. W. Himalayas. Greenhouse species. SYN. *A. Dalhousiæ*.

A. alternifolium (alternate-leaved). Synonymous with *A. germanicum*.

A. angustifolium (narrow-leaved).* *sti.* tufted, about 1ft. long. *fronds* 18in. to 24in. long, 4in. to 6in. broad, simply pinnate, lanceolate-oblong, flaccid, with twenty to thirty sub-sessile pinnæ on each side, sterile ones largest, 2in. to 3in. long, ½in. broad, acuminate; edge obscurely-crenate, base rounded and equal on both sides; fertile pinnæ narrower and more distant. *sori* very close and regular, extending from the midrib nearly to the edge. Canada, &c. Greenhouse species.

A. anisophyllum (unequal-leaved). *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 6in. to 9in. broad, oblong-lanceolate, simple pinnate, with ten to sixteen sub-sessile pinnæ

on each side which are 3in. to 5in. long, about 1in. broad, acuminated, crenate, the two sides unequal, the upper one narrowed suddenly, the lower one obliquely truncate at the base. *sori* distant, elliptical, reaching half-way from the edge to the margin. Cape Colony, &c. Greenhouse species.

A. apicidens (apex-toothed). A variety of *A. Vieillardii*.

A. arborescens (tree-like). *cau.* oblique. *sti.* 1ft. to 2ft. long. *fronds* 3ft. to 4ft. long, 2ft. to 3ft. broad, deltoid, tripinnatifid, with numerous pinnæ, the lower ones 12in. to 18in. long, 4in. to 6in. broad; pinnules 3in. long, about ½in. wide, acuminate, edge cut two-thirds of the way down to the rachis into nearly entire lobes, ¼in. deep, ⅛in. broad. Lower *sori* ⅛in. long. Mauritius, &c., 1826. Stove species. SYN. *Diplazium arborescens*.

A. Arnottii (Arnott's). *sti.* smooth, angular. *fronds* ample, tripinnatifid; lower pinnæ 9in. to 12in. long, 4in. to 6in. broad; pinnules 3in. to 4in. long, 1in. or more broad, cut down below to a distinctly winged rachis into deeply crenate, blunt, oblong lobes, ½in. deep, ¼in. broad. *sori* copious, nearly all diplazioid, and filling up when mature nearly the whole surface of the lobes. Sandwich

Islands, 1877. Greenhouse species. SYNS. *A. diplazioides* and *Diplazium Arnottii*.

A. aspidioides (Aspidium-like). *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, ovate-deltoid, tripinnatifid; lower pinnæ 6in. to 8in. long, lanceolate-deltoid; pinnules lanceolate, cut down below nearly to the rachis into inciso-pinnatifid ovate segments, two lines broad. *sori* copious, oblong, the lower ones curved. Tropical America, &c. Greenhouse species. SYN. *A. multisectum*.

A. attenuatum (attenuated). *sti.* tufted, 3in. to 4in. long. *fronds* simple, linear-lanceolate, about 1ft. long, about ½in. broad, narrowed upwards very gradually, sometimes proliferous at the point, the margin toothed; the lower third also lobed; the lowest roundish, lobes reaching down nearly or quite to the rachis. *sori* reaching nearly to the edge. Queensland, &c. Greenhouse species.

A. aureum (golden). A variety of *A. Ceterach*.

A. auriculatum (auriculated).* *sti.* tufted, 4in. to 8in. long. *fronds* 12in. to 18in. long, 4in. to 6in. broad, simply pinnate, lanceolate-oblong, with ten to twenty-stalked horizontal pinnæ on each side, which are 2in. to 4in. long, ¾in. to 1in. broad,

lanceolate, often sub-falcate; edge deeply crenate, the two sides unequal, the upper one with a cordate auricle, the lower one obliquely truncate. *sori* distant, not reaching either the midrib or edge. Tropical America, 1820. Stove species.

A. auritum (eared). *sti.* tufted, 4in. to 8in. long. *fronds* 6in. to 12in. long, 2in. to 4in. broad, simply pinnate, with ten to fifteen stalked horizontal pinnæ on each side, which are 2in. to 3in. long, and about ½in. broad, acute or bluntish; edge sharply toothed or often lobed, especially on the upper side towards the base. *sori* in two broad rather oblique rows. Tropical America. Stove species.

A. australasicum (Australian). A variety of *A. Nidus*.

A. Baptistii (Baptist's).* *sti.* 6in. to 8in. long. *fronds* 1ft. long, bipinnate, broadly ovate; pinnæ stipitate, the lower about 5in. long, with four narrow stipitate linear-toothed pinnules, 2in. long, and a terminal lobe, 3½in. long, ¼in. broad, furnished with distinct linear marginal teeth, pointing forwards, and terminating in a long attenuated point, which is toothed nearly to the end. *sori* linear-oblong, straight, parallel with, and close to, the

midrib. South Sea Islands, 1879. A very handsome stove species.

A. Belangeri (Belanger's).* *sti.* tufted, 4in. to 8in. long. *fronds* 12in. to 18in. long, 2in. to 3in. broad, bipinnate; pinnæ numerous, 1in. to 1½in. long, ½in. broad, rounded at the point, truncate at the base on the lower side; pinnules linear, erecto-patent, half line broad; one vein and sorus to each segment, the latter marginal. Malayan Peninsula. Stove species. SYNS. *A. Veitchianum*, *Darea*, *Belangeri*, &c.

A. bipartitum (twice-partite). *sti.* tufted, 3in. to 6in. long. *fronds* 6in. to 8in. long, 2in. to 3in. broad, bipinnate, with about ten to fifteen stalked pinnæ on each side, which are 1in. to 1½in. long, ½in. to ¾in. broad, bluntish, cut down at the base on the upper side into one distinctly-stalked cuneate pinnule, sometimes into two or three, the outer edge inciso-crenate, the base on the lower side obliquely truncate. *sori* in two regular rows, reaching nearly to the edge. Mascaren Isles. Stove species.

A. bisectum (bisected).* *sti.* tufted, 4in. to 6in. long. *fronds* 12in. to 18in. long, 4in. to 6in. broad, bipinnatifid, with twenty to thirty horizontal pinnæ on each side, which are 2in. to 3in. long, ¼in.

broad, with a very long, narrow, deeply inciso-pinnatifid upper portion, the base on the upper side narrowed suddenly, on the lower obliquely truncate. *sori* almost all in two parallel rows close to the midrib. West Indies, &c. Stove species.

A. brachypteron (broadly-winged). *sti.* tufted, 2in. to 4in. long. *fronds* 4in. to 6in. long, 1in. to 1½in. broad, bipinnate, with twelve to twenty-four horizontal pinnæ on each side, of which from half to nearly the whole of the lower side is cut away, the largest ½in. to ⅝in. long, cut down to the rachis into simple or forked linear pinnules, 1in. to 1½in. long. *sori* solitary, often quite marginal. Madagascar, &c. Stove species. SYN. *Darea brachypteron*.

A. brevisorum (shortly-soriate). *sti.* 12in. to 18in. long. *fronds* 2ft. to 3ft. long, 9in. to 18in. broad, tripinnate; lower pinnæ 1ft. or more long; pinnules lanceolate, distant, 2in. to 3in. long, and 1½in. broad; segments lanceolate, ¾in. long, two lines broad, deeply and sharply toothed. *sori* small, six to twelve to a segment, in two rows near the midrib, the lower ones curved, often double. Jamaica, &c. Stove species. SYN. *Athyrium brevisorum*.

A. bulbiferum (bulb-bearing). *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, oblong-deltoid, with numerous horizontal pinnæ on each side, which are often proliferous from the upper surface, the largest 4in. to 8in. long, 1½in. to 2in. broad; pinnules lanceolate-deltoid, slightly toothed. *sori* oblong, when mature often filling the whole breadth of the segments. New Zealand, &c., very widely distributed. Greenhouse species.

A. b. Fabianum (Fabia's). Lower segments deeply pinnatifid, with narrow divisions and sub-marginal sori. SYN. *A. Fabianum.*

A. b. laxum (loose). Habit more slender; segments narrow, so that the sori are often as if marginal.

A. caudatum (tailed). Probably a form of *A. falcatum*, but having the sori more confined to the centre of the pinnæ, being often restricted to two parallel rows close to the rachis. Polynesia, &c. Greenhouse species.



Fig. 170. Asplenium Ceterach.

A. Ceterach.* Scale or Scaly Fern. *sti.* densely tufted, 1in. to 3in. long, scaly. *fronds* 4in. to 6in. long, ½in to 1in. broad, cut down nearly or quite to the rachis into alternate, blunt, sub-entire, broadly-oblong or roundish pinnæ, with a rounded sinus between them; upper surface naked, lower densely clothed with deep brown membranous scales. *sori* linear oblique. Britain, throughout Europe, Northern Asia, &c. This is a variable species, but the forms do not remain constant under cultivation. It should be firmly planted in a vertical chink of the rockery in loam, lime rubbish, rock chippings, and sand, and be watered freely during the summer. Syn. *Ceterach officinarum*. See Fig. 170.

A. C. aureum (golden).* A large

variety, producing fronds from 9in. to 15in. long, 1½in. to 3in. broad, and pinnæ more oblong than the type; scales toothed. Canaries and Madeira. This is a charming fern, requiring greenhouse treatment. SYN. *Ceterach aureum*.

A. cicutarium (Cicuta-leaved).* *sti.* tufted, 4in. to 8in. long. *fronds* 6in. to 15in. long, 4in. to 6in. broad, tripinnate, with ten to fifteen horizontal pinnæ on each side, the lower ones 2in. to 3in. long, 1in. broad, cut down to the rachis into numerous ovate-rhomboidal pinnules, which are ⅜in. to ½in. long, ¼in. broad, obliquely-truncate on the lower side; segments once or twice cleft at the apex. *sori* principally in two rows along the pinnules. Tropical America, &c. Stove species.

A. Colensoi (Colenso's). *sti.* tufted, 3in. to 4in. long. *fronds* 6in. to 9in. long, 2in. to 4in. broad, tripinnatifid, with numerous rather rigid erecto-patent pinnæ, the lower on stalks ¼in. to ½in. long; lower pinnules spreading, deeply inciso-pinnatifid, with linear segments. *sori* oblong, solitary. New Zealand. A beautiful greenhouse species. SYN. *A. Hookerianum*.

A. compressum (compressed). *sti.* tufted, 6in. to 8in. long. *fronds* 2ft. to

3ft. long, 8in. to 12in. broad, simply pinnate, lanceolate-oblong, with ten to twenty sessile pinnæ on each side, which are 4in. to 6in. long, about 1in. broad, acute or bluntish at the point, edge slightly dentate, the upper ones decurrent at the base upon the stout fleshy compressed rachis, the upper side narrowed suddenly at about a right angle, the lower one obliquely truncate. *sori* broad, distant, not reaching either the midrib or edge. St. Helena. Stove or greenhouse species.

A. contiguum (contiguous). *sti.* tufted, 6in. to 9in. long. *fronds* 12in. to 18in. long, 4in. to 6in. broad, with twenty to thirty horizontal sub-falcate pinnæ on each side, which are acuminated at the apex; edge more or less serrated, the base narrowed suddenly, and sometimes auricled on the upper, obliquely truncate in a curve on the lower side. *sori* close, copious, falling considerably short of the margin. Sandwich Isles. Greenhouse species.

A. crenatum (crenated).* *sti.* 6in. to 12in. long, scattered. *fronds* 9in. to 15in. each way, deltoid, tri- or quadripinnate, with nine to twelve pinnæ on each side, the lowest much the largest, 6in. to 9in. long, 1½in. to 2in. broad; pinnules lanceolate, cut down to the rachis except

towards the point on each side into four to six blunt oblong segments, two lines long, one line broad, which are bluntly toothed. *sori* two to six to a segment, oblong, usually nearly straight, often double. Scandinavia, &c. Hardy species.

A. cultrifolium (hook-leaved).* *sti.* 4in. to 6in. long. *fronds* 6in. to 12in. long, 4in. to 6in. broad, bipinnate, deltoid-ovate, with a lobed terminal point and six to ten pinnæ on each side, which are 3in. to 4in. long, ½in. to ¾in. broad, acute; edge broadly toothed, sometimes lobed below nearly or quite to the rachis, the base nearly at a right angle on the upper, but obliquely truncate on the lower side. *sori* falling short both of the edge and midrib. West Indies, 1820. Stove species. SYN. *Diplazium cultrifolium*.

A. cuneatum (wedge-shaped). *sti.* tufted, 6in. to 9in. long. *fronds* 6in. to 15in. long, 6in. to 9in. broad, tripinnatifid, narrow-deltoid, with numerous spreading pinnæ on each side, the lower 3in. to 4in. long, 1in. to 1½in. broad, lanceolate-deltoid, cut down to the rachis into several distinct ovate-cuneate pinnules, which are dentate and cut down in the lower part nearly or quite to the rachis. *sori* linear, sub-flabellate. West Indies, and widely distributed

in both hemispheres, 1832. A very handsome stove species.

A. Dalhousiæ (Dalhouse's). Synonymous with *A. alternans*.

A. decussatum (decussate). *sti.* 1ft. to 2ft. long. *fronds* 2ft. to 4ft. long, simply pinnate, with numerous pinnæ on each side, which are 6in. to 12in. long, 1in. to 2in. broad, often proliferous in the axils; edge nearly entire. *sori* reaching nearly to the edge, and copiously double. Polynesian and Malayan Islands, &c. Stove species. SYN. *Anisogonium decussatum*.

A. dentatum (dentated).* *sti.* tufted, 2in. to 6in. long. *fertile fronds* 2in. to 3in. long, 1in. broad, with six to eight pairs of stalked, sub-opposite pinnæ, which are ½in. broad, ⅜in. deep, oblong-rhomboidal, the lower side at the base truncate in a curve, the outer edge irregularly crenate. *sterile fronds* smaller, on shorter stalks. *sori* copious, in two parallel rows. West Indies, &c., 1820. A pretty little greenhouse species.

A. dimidiatum (unequal-sided).* *sti.* tufted, 6in. to 12in. long. *fronds* 6in. to 15in. long, 4in. to 6in. broad, deltoid, simply pinnate, with six to nine opposite pairs of pinnæ, which are 2in. to 3in. long, ¾in. to 1in. broad, acuminated, sharply serrated. *sori* radiant, narrow, long linear.

Tropical America. Stove species.

A. dimorphum (two-formed).* *sti.* tufted, 6in. to 12in. long. *fronds* 2ft. to 3ft. long, 12in. to 15in. broad, ovate-deltoid, sterile and fertile ones different or combined; lower pinnæ ovate-deltoid, 6in. to 8in. long, 2in. broad, bluntly toothed, and the base on the lower side obliquely truncate; fertile pinnæ the same size, but with very narrow simple or forked pinnules. *sori* linear, solitary, marginal. Norfolk Island. One of the handsomest warm greenhouse species. SYNS. *A. diversifolium* (of gardens), and *Darea dimorpha*.

A. diplazioides (Diplazium-like). A synonym of *A. Arnottii*.

A. diversifolium (diverse-leaved). A garden synonym of *A. dimorphum*.

A. diversifolium (diverse-leaved). Synonymous with *A. maximum*.

A. ebeneum (ebony-stalked).* *sti.* tufted, 3in. to 6in. long. *fronds* 12in. to 18in. long, 2in. to 3in. broad, linear-lanceolate, with twenty to forty sessile pinnæ on each side, which are about 1in. long, ⅛in. broad; point acute or bluntish; edge faintly serrate; base hastately auricled, often cordate. *sori* ten to twelve on each side, oblong, short. Canada, &c., widely distributed, 1779. Greenhouse species. *A.*

ebenoides is very like this, but the pinnæ are not cut down to the rachis, and the frond has an elongated point, which is only sinuated with a single row of sori on each side.

A. erectum (erect). Synonymous with *A. lunulatum*.

A. erosum (bitten). *sti.* tufted, 6in. to 9in. long. *fronds* 6in. to 12in. long, 4in. to 8in. broad, deltoid, with nine to fifteen pinnæ on each side, which are 3in. to 4in. long, ½in. to ¾in. broad, the edge slightly lobed and crenato-dentate, the point acuminate, the two sides unequal. *sori* falling short of the edge. West Indies. Stove species.

A. esculentum (edible).* *cau.* sub-arborescent. *sti.* 1ft. to 2ft. long. *fronds* 4ft. to 6ft. long, pinnate or bipinnate; lower pinnæ 12in. to 18in. long, 6in. to 8in. broad; pinnules 3in. to 6in. long, about 1in. broad, acuminate; edge more or less deeply lobed; base narrowed suddenly, often auricled; lines of *sori* often on all the lateral veinlets. India, &c., 1822. Stove species. SYN. *Anisogonium esculentum*.

A. extensum (extended). *sti.* tufted, 4in. to 6in. long. *fronds* 12in. to 24in. long, about 1in. broad, with twenty to forty sessile pinnæ on each side, which are ½in. long, ¼in. to

⅜in. deep, blunt and entire, the upper side rather the broadest and often cordate, the lower merely rounded at the base. *sori* linear-oblong, two or three on each side of the midrib. Andes of Columbia and Peru. A very rare greenhouse species, allied to our native *A. Trichomanes*.

A. Fabianum (Fabia's). Synonymous with *A. bulbiferum Fabianum*.

A. falcatum (hooked).* *sti.* tufted, 6in. to 9in. long. *fronds* 6in. to 18in. long, 4in. to 6in. broad, lanceolate, with six to twenty stalked, nearly horizontal pinnæ on each side, which are 2in. to 3in. long, ½in. to 1in. broad, acuminated, the edges lobed often one-third of the way down, and the lobes sharply toothed, the two sides unequal, and the lower one at the base obliquely truncate. *sori* in long irregular lines reaching nearly to the edge. Polynesian Islands, &c., widely distributed. A very elegant greenhouse species.

A. fejeense (Fijian).* *rhiz.* wide-climbing. *sti.* 6in. long, scaly below. *fronds* 18in. to 24in. long, 1in. to 1½in. broad, lanceolate, caudate, or acuminate at the apex, and often proliferous, narrowed below to a truncate base, the margin nearly entire. *sori* reaching from the midrib nearly to the edges. Fiji, Samoa. &c.

Stove species.

A. Fernandesianum (Juan Fernandez). A variety of *A. lunulatum*.

A. Filix-fœmina (Lady Fern).* *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 3ft. long, 6in. to 12in. broad, oblong-lanceolate, with numerous pinnate pinnæ, the lower ones spreading, lanceolate, 3in. to 6in. long, 1in. to 1½in. broad; pinnules deeply inciso-pinnatifid. *sori* linear-oblong, the lower ones often curved. Britain, and world-wide in its distribution. SYN. *Athyrium Filix-fœmina*. This handsome deciduous species has a great number of varieties, the most important of which are described below:

A. F.-f. acrocladon (summit-branched).* *fronds* 9in. to 15in. long, slender, bi- or tripinnate, the lower part very narrow, with the apices of the pinnæ sometimes crested; upper portion of the frond freely branched, divisions narrow and crested, the whole forming a broad head.

A. F.-f. acuminatum (taper-pointed).* *fronds* 9in. to 12in. long, lanceolate-acuminate in outline, with closely set pinnæ, which are similarly characterised, and particularly tapering at the apices.

A. F.-f. apiculatum (apiculate).*

fronds 6in. to 15in. long, 2in. to 4in. broad, lanceolate-acuminate in outline, with variously furcate apices; pinnæ closely set with distinctly acuminated apices, and small roundish obtuse serrated pinnules.

A. F.-f. Applebyanum (Appleby's).* *fronds* narrow, 12in. to 24in. long, with short blunt pinnæ, while the extremities are dilated into a broad furcated crest, which is very striking upon such a narrow frond.

A. F.-f. Barnesii (Barnes's).* *fronds* 9in. to 15in. long, 3in. to 4in. wide, lanceolate in outline, abrupt at the top, bipinnate; pinnæ alternate, closely set, lanceolate, acutely pointed, with densely set, narrow, acutely serrate pinnules, with a very membranous texture.

A. F.-f. calothrix (beautiful-hair).* *fronds* 9in. to 15in. long, copiously divided into exquisitely fine segments, so that the fronds present a very light and delicate appearance.

A. F.-f. contortum (contorted).* *fronds* very diversified, the various pinnæ occasionally combining the characters of the varieties *Applebyanum* and *Victoriæ*.

A. F.-f. coronatum (coronate).* *fronds* 6in. to 12in. long, 2in. wide; pinnæ distinctly forked, sometimes

slightly crested at the apices; the upper extremity of the frond copiously forked, and by the ramification of the divisions a broad crest is formed, about 3in. to 4in. across.

A. F.-f. corymbiferum (corymbose).* *fronds* 12in. to 18in. long, 4in. to 7in. broad, lanceolate-acuminate in general outline; pinnæ closely set, usually forked and crested at the apices, while the extremities of the fronds are dilated into broad crests, nearly or quite as wide at the broadest portion of the frond.

A. F.-f. crispum (crispy or curled).* *fronds* 6in. long, densely set with very finely divided pinnæ, which are thickly curled, presenting a crispy appearance.

A. F.-f. dissectum (dissected).* *fronds* 6in. to 12in. long, ovate or broadly lanceolate in form, with irregular and unequal pinnæ; the pinnules also differ very much, and are deeply cut, nearly down to the rachises.

A. F.-f. Elworthii (Elworth's).* *fronds* 12in. to 20in. long, lanceolate, tripinnate, terminated with a very dense crest, from 4in. to 6in. across; pinnæ and frequently the pinnules also more or less forked and crested.

A. F.-f. Fieldiæ (Field's).* *fronds* 12in. to 20in. long, narrow, with regular or variously-forked divided pinnæ, sometimes arranged crosswise, with a very graceful disposition.

A. F.-f. Friselliæ (Frisell's).* *fronds* pendent, sometimes 2ft. long, rarely exceeding 1in. wide, bi- or tripinnate; pinnæ alternate, imbricated, flabellate, with the margins of the pinnules or ultimate divisions dentated.

A. F.-f. grandiceps (large-crested).* *fronds* 9in. to 15in. long, lanceolate in outline, copiously forked both at the extremities of the pinnæ and frond. The latter is furnished with a very large globose crest, which causes the frond to present a beautifully arched appearance.

A. F-f. Grantæ (Grant's).* *fronds* 9in. to 12in. long, lanceolate, or broadly so, very thickly set with pinnæ, copiously divided, with the apices of the latter turned up, so that the plant has a crisp or bristly appearance.

A. F.-f. Jonesii (Jones's).* *fronds* 12in. to 18in. long, oblong-lanceolate in outline, slightly acuminate, bipinnate, furnished at the extremities with a small crest; pinnæ alternate, copiously forked and crested at the apices, even

having larger crests than the one at the upper extremity of the frond; pinnules narrow, dentate, slightly crested.

A. F.-f. minimum (smallest).* *fronds* 4in. to 6in. long, 1in. wide, lanceolate, bipinnate; pinnules densely set, imbricated, and crispy.

A. F.-f. Moorei (Moore's).* *fronds* 4in. to 8in. long, linear, terminated with a broad tasselled crest, 3in. or more in diameter; pinnæ small, scattered, variously forked, crested, and slender.

A. F.-f. multifidum (many-fid).* A very vigorous growing variety, producing fronds as large as those of the type, terminated with large tasselled crests; pinnæ and pinnules narrow, the former furnished with small crested apices. A variety known as *nanum* much resembles the foregoing, but the crests are more dense, and the fronds are usually not more than half the length.

A. F.-f. pannosum (pannose).* *fronds* 10in. to 20in. long, lanceolate in outline, from 4in. to 6in. in the broadest part, bi- or (rarely) tripinnate; pinnæ thickly set, closely alternated, lanceolate-acuminate in form, with deep cut pinnules, and distinctly but irregularly lobed; the whole frond is frequently tinged with reddish-purple.

A. F.-f. plumosum (feathery).* *fronds* 12in. to 30in. long, 4in. to 10in. broad, broadly lanceolate in outline, tripinnate, beautifully arched; pinnæ of the same form as the frond, copiously divided; pinnules again divided into very fine segments. There are several forms of this charming variety.

A. F.-f. Pritchardii (Pritchard's).* *fronds* 12in. to 30in. long, very narrow, tapering especially towards the apices; pinnæ decussate, imbricate, rather irregular, with the margins of the pinnules dentate. There is also a variety named *cristatum*, which is finely crested at the apices of the pinnæ, and is particularly striking.

A. F.-f. ramosa (branched).* *fronds* 9in. to 12in. long, the lower portion sparsely set with short irregular pinnæ, sharply cut into finely dentate pinnules; the upper part is divided into two main branches, which are again variously forked, and furnished with short pinnæ, the ultimate divisions furcate and slightly crested.

A. F.-f. scopæ (heavily-crested).* *fronds* 6in. to 16in. long, with a few scattered irregular pinnæ along the main rachis; some of the pinnæ are almost obsolete, while others are an inch long with oblong-dentate

pinnules and a heavy terminal crest; the upper portion has several ramifications, each of which is copiously forked and heavily crested, the whole forming a corymbose head 3in. or 4in. in diameter, which gives the plant a pendent habit.

A. F.-f. sub-lunatum (half-crescent-shaped).* *fronds* 9in. to 20in. long, less than 1in. wide, with curious alternated, nearly crescent-shaped, much contracted pinnæ, sparingly divided, arching.

A. F.-f. Victoriæ (Victoria's).* *fronds* long, lanceolate in outline, with the apices crested, as well as those of the pinnæ; the latter are forked at the base, the divisions being divergent, and crossing those of the neighbouring pinnæ. A form named *gracilis* has narrower fronds, is more compact, and cresting rather thicker. There is also another form named *lineare*, having very small heavily crested fronds, and an extremely elegant appearance. The foregoing are the most important varieties, but a very comparative few of the total number. Although forms of an essentially hardy species, the greater number—and particularly the rarer sorts—should have a winter protection; or, what is far more preferable and satisfactory, they

should be grown in the frame or temperate fernery.

A. firmum (firm-textured). Synonymous with *A. abscissum*.

A. fissum (cut).* *sti.* tufted, 2in. to 6in. long. *fronds* 2in. to 5in. long, 1in. to 2in. broad, oblong-deltoid, tripinnatifid, with a few distant pinnæ on each side; pinnules flabellato-cuneate, deeply pinnatifid; ultimate segments under half a line broad. *sori* linear-oblong, when mature occupying the whole breadth of the segments. South Europe. A pretty little frame or greenhouse species.

A. flabellifolium (fan-leaved).* *sti.* tufted, 3in. to 6in. long. *fronds* procumbent, wide straggling, elongated, and rooting at the apex, 6in. to 12in. long, ¾in. to 1in. broad, with ten to fifteen sessile flabellate pinnæ on each side, which are ¼in. to ½in. each way, broadly lobed; lobes sharply toothed, the base cut away in a curve on the lower side. *sori* oblique, irregular, copious. Temperate Australia, &c. Greenhouse species.

A. f. majus (greater). This is a larger form, with longer fronds and broader pinnæ.

A. flaccidum (relaxed). *sti.* tufted, 4in. to 8in. long. *fronds* 1ft. to 3ft.

long, 4in. to 8in. broad, often pendent, with numerous lanceolate pinnæ, which are 4in. to 8in. long, and about ½in. broad, sometimes rather rigid and recurved, sometimes quite flaccid and drooping, like the main rachis, sometimes deeply pinnatifid, but more often cut down to the thick rachis in oblique or sub-falcate linear lobes. *sori* in the divided form quite marginal. New Zealand, &c. SYNS. *A. odontites* and *Darea flaccida*.

A. fœniculaceum (Fennel-like). A variety of *A. fragrans*.



FIG. 171. ASPLENIUM FONTANUM.

A. fontanum (rock).* *sti.* tufted, 2in. to 4in. long. *fronds* 3in. to 6in. long, 1in. to 1½in. broad, oblong-lanceolate; lower pinnæ short, reflexed; central ones horizontal,

about ½in. long; pinnules stalked, lower ones oblong, deeply inciso-pinnatifid. *sori* copious, covering nearly the whole under surface of the pinnule. England, &c. Hardy. This requires to be planted in a well-drained chink of the rockery, in rich gritty soil. SYN. *A. Halleri. A. refractum* is a well-marked variety. See Fig. 171.

A. formosum (beautiful). *sti.* tufted, very short. *fronds* 12in. to 18in. long, 1in. broad, with twenty to thirty sessile horizontal pinnæ on each side, which are ½in. long, one and a-half to two lines deep; upper edge deeply cut, point rather obtuse, lower edge truncate in a straight line. *sori* linear-oblong, short, oblique, placed one to four on each side of the midrib. Tropical America, &c., 1822. A very elegant stove species.

A. fragrans (fragrant).* *sti.* tufted, 4in. to 8in. long, *fronds* 6in. to 9in. long, 3in. to 6in. broad, sub-deltoid, tripinnate, with numerous close placed deltoid pinnæ on each side, the lowest 3in. long, 1in. to 1½in. broad; pinnules lanceolate-deltoid; segments sub-spathulate, one line broad, dentate round the outer edge. *sori* copious. Tropical America, 1793. *A. fœniculaceum* is a variety with narrowly linear ultimate

segments. Both are very handsome stove plants, the latter being especially beautiful.

A. Franconis (Franconis).* *sti.* tufted, 1ft. long. *fronds* 1ft. to 2ft. long, 9in. to 15in. broad, deltoid, with numerous pinnæ on each side, the lower ones 6in. to 8in. long, much acuminated, cut down in the lower half into distinct pinnules, 1½in. to 2in. long, ½in. broad, lanceolate, unequal sided, the edge cut half-way down below into oblong sharply-toothed lobes; the lower side obliquely truncate. *sori* in parallel rows, not reaching the edge. Mexico, &c. Stove species. SYN. *Diplazium Franconis*.

A. furcatum (forked).* *sti.* tufted, 4in. to 8in. long, *fronds* 6in. to 18in. long, 4in. to 6in. broad, with twelve to twenty pinnæ on each side, which are lanceolate-deltoid, 2in. to 3in. long, ¾in. to 1in. broad, nearly or quite pinnate; pinnules linear-cuneate, sharply serrated on the outer edge. *sori* linear, distant. Very widely distributed in the tropical and sub-tropical regions of both hemispheres. A most elegant greenhouse species. SYN. *A. præmorsum*.

A. germanicum (German).* *sti.* densely tufted, 2in. to 4in. long. *fronds* 2in. to 3in. long, ½in. to 1in.

broad, lanceolate, cut down to the rachis into a few narrow flabellato-cuneate pinnæ on each side, the lowest of which are again deeply cleft. *sori* linear, when mature covering the whole breadth, but falling short of the point of the pinnæ. Scotland and Norway to Hungary and Dalmatia. Hardy or frame species. SYN. *A. alternifolium*.

A. giganteum (gigantic). A synonym of *A. radicans*.

A. Goringianum pictum (painted).* A very pretty form of *A. macrocarpum*; the fronds are from 6in. to 18in. long, pendulous, somewhat lanceolate in form; rachis reddish, with the pinnæ next it on each side variegated, forming a central grey band throughout its entire length. Japan. Greenhouse species, or hardy in sheltered positions.

A. grandifolium (large-leaved). *sti.* 1ft. or more long. *fronds* 2ft. to 3ft. long, 9in. to 12in. broad, deltoid-lanceolate, the point pinnatifid, with twelve to twenty pinnæ on each side; the lower ones 2in. or more apart, distinctly stalked, 4in. to 6in. long, 1in. to 1½in. broad, acuminate; edge slightly toothed, and sometimes broadly lobed below, the base equally rounded on both sides. *sori* irregular, falling slightly

short of both midrib and edge. Tropical America, 1793. Stove species. SYN. *Diplazium grandifolium*.

A. Grevillei (Greville's). *fronds* undivided, 12in. to 18in. long, 2in. to 3in. broad, lanceolate-spathulate, narrowed to an acute apex, and suddenly below to a broadly winged stipe, which grows very gradually narrower downwards; the margin entire. *sori* usually extending within a short distance of the edge. India. Stove species.

A. Halleri (Haller's). Synonymous with *A. fontanum*.

A. Hemionitis (Hemionitis).* *sti.* tufted, 4in. to 8in. long. *fronds* 4in. to 6in. each way, hastate, with a triangular, acute terminal lobe, and two large, cordate, acute lateral ones, again bluntly or acutely lobed at the base; the basal sinus rounded, 1in. or more deep, and the lobes on each side imbricated over one another and the petiole. *sori* narrow upon the simple veins. South Europe, &c. A pretty greenhouse species. SYN. *A. palmatum*.

A. H. cristatum (crested).* Similar in frond form and size to the species, but the apices are crested and tasselled. Where variety is sought, this should certainly be grown.

A. H. multifidum (much-divided).*

fronds quite as broad as long; the main divisions again freely divided or deeply cut, so as to give them a fringed outline. Azores.

A. heterocarpum (various-fruited).* *sti.* scattered, 4in. to 9in. long. *fronds* 6in. to 15in. long, 1½in. to 2in. broad, narrow-lanceolate, with very numerous close-placed dimidiate pinnæ on each side, which are ¾in. to 1in. broad, ¼in. deep; the lower edge quite entire, the upper broadest towards the base, where it is narrowed suddenly, deeply incised throughout. *sori* one, or rarely two, together in the teeth. Himalayas, and widely distributed in south-eastern Asia. A very lovely stove or greenhouse species.

A. heterodon (variously-toothed). Synonymous with *A. vulcanicum*.

A. Hookerianum (Hooker's). Synonymous with *A. Colensoi*.

A. incisum (incised). *sti.* tufted, 1in. to 3in. long. *fronds* 6in. to 12in. long, 1½in. to 2in. broad, lanceolate, with numerous pinnæ on each side; lower distant and blunt, central ones 1in. long, ½in. broad, lanceolate-deltoid; pinnules ovate-rhomboidal, pinnate, much truncated at the base on the lower side and deeply inciso-pinnatifid. *sori* linear-oblong, one to each vein. Japan, &c. Greenhouse species.

A. javanicum (Javanese). *See* **Allantodia Brunoniana.**

A. lanceolatum (lanceolate).* *sti.* tufted, 3in. to 4in. long. *fronds* 6in. to 9in. long, 2in. to 4in. broad; lower pinnæ distant, 1in. to 1½in. long, ¼in. to ⅜in. broad; pinnules oblong-rhomboidal, sharply toothed, and often broadly lobed below. *sori* copious, when mature covering nearly the whole under surface. South-west Europe, including southern England, &c. Hardy species.

A. l. crispatum (curled).* *fronds* 4in. to 8in. long, broadly-lanceolate, bipinnate, with the margins of the pinnules involute and sharply toothed, giving them a curled appearance.

A. l. microdon (small-toothed).* *fronds* 4in. to 6in. long, simply pinnate, with deeply lobed pinnæ, the margins of the lobes very finely dentated and toothed. A pretty little gem, well adapted for case culture.

A. lanceum (lance-shaped). *sti.* scattered, 4in. to 6in. long. *fronds* 6in. to 9in. long, ¾in. to 1in. broad, attenuated gradually upwards and downwards, the edge entire or slightly undulated. *sori* linear, irregular, reaching nearly to the edge, but not to the midrib. Himalayas, &c. Greenhouse species. Syn. *A. subsinuatum* and *Diplazium*

lanceum.

A. laserpitiifolium (Laserpitium-leaved).* *sti.* tufted, 6in. to 12in. long, naked. *fronds* 1ft. to 4ft. long, 4in. to 18in. broad, deltoid-lanceolate, with numerous pinnæ on each side, 2in. to 9in. long, and from 2in. to 6in. broad, cut down to the rachis into numerous distinct pinnules, the lowest with rhomboidal-cuneate segments. *sori* short, irregular. Polynesian Islands, North Australia, &c. A very handsome greenhouse species.

A. laxum (loose). A variety of *A. bulbiferum*.

A. lineatum (streaked). *sti.* tufted, 6in. to 9in. long. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad, oblong-lanceolate, with twenty to thirty pinnæ on each side, which are 3in. to 4in. long, about ½in. broad, acuminate, dentate, nearly or quite sessile, the base cuneate. *sori* very regular, reaching from the midrib nearly to the edge. Mauritius, &c. There are several forms of this species: those with small narrow cuneate pinnules, *inequale*; those with deeply bifid or pinnatifid pinnules, *bifida*. Stove species.

A. longissimum (longest).* *sti.* tufted, 3in. to 12in. long. *fronds* 2ft. to 8ft. long, 4in. to 8in. broad, lanceolate-elongate, pendulous,

proliferous, and rooting at the apex, with very numerous pinnæ on each side, which are 2in. to 4in. long, ¼in. broad, acuminated, the two sides nearly equal, with a distinct central midrib; edge slightly toothed, the base on both sides often auricled. *sori* numerous, in two regular rows on each side the midrib, and reaching nearly to the edge. Malacca, &c., 1840. A very distinct stove fern for baskets.

A. lucidum (clear). A synonym of *A. obtusatum lucidum*.

A. lunulatum (crescent-shaped).* *sti.* tufted, 2in. to 4in. long. *fronds* 6in. to 18in. long, 1½in. to 2in. broad, simply pinnate, narrowly lanceolate-oblong, with twelve to twenty pinnæ on each side, which are 1in. to 1½in. long, ¼in. to ½in. broad, bluntish or acute, more or less deeply inciso-crenate throughout, the two sides unequal; the upper one on the base narrowed suddenly, the lower one obliquely truncate; lower pinnæ often deflexed. *sori* falling short of both edge and midrib. Tropics. SYN. *A. erectum*.

A. l. Fernandesianum (Fernandez).* A form with a more rigid rachis and sub-coriaceous, rather narrower pinnæ. Juan Fernandez.

A. macrocarpum (large-fruited). *sti.* 6in. to 9in. long. *fronds* 12in. to 24in. long, 6in. to 12in. broad, ovate-lanceolate, with numerous pinnæ on each side, the lowest 3in. to 6in. long, 1in. to 1½in. broad, lanceolate; pinnules oblong-rhomboidal, inciso-crenate or pinnatifid. *sori* copious, large. Himalayas. Greenhouse species. SYN. *Athyrium macrocarpum*.

A. macrophyllum (long-leaved). Synonymous with *A. nitens*.

A. marginatum (margined). *sti.* 2ft. to 3ft. long, strong, erect woody, about ½in. thick at the base. *fronds* simply pinnate, 4ft. to 6ft. long; pinnæ in several opposite pairs, the lowest 1ft. to 2ft. long, 3in. to 4in. broad, the edge entire, the base often cordate. *sori* long, linear, confined to the free veins. Tropical America. Stove species. SYN. *Hemidictyum marginatum*.

A. marinum (sea).* Sea Spleenwort. *sti.* tufted, 3in. to 6in. long. *fronds* 6in. to 18in. long, 2in. to 4in. broad, oblong-lanceolate, apex pinnatifid; pinnæ of the lower half quite deltoid, the point acute or obtuse, margin crenato-dentate. *sori* broad, falling short of the edge. Europe, including Britain. Although perfectly hardy, this requires to be grown in a frame or cool house.

A. m. coronans (crowned).* *fronds* 4in. to 6in. long, simply pinnate; pinnæ for two-thirds of the way up variable in form, and irregularly lobed and cut; the upper third freely branched with numerous imbricated, curled, and slightly crested divisions, forming a dense head 2in. or more across. A dwarf and pretty form.

A. m. crenatum (crenated). *fronds* 4in. to 8in. long, broadly-lanceolate; pinnæ nearly trapeziform, obtuse, with deeply crenated margins. A very pretty form.

A. m. mirabile (wonderful).* *sti.* 2in. to 4in. long. *fronds* about the same length, the rachis divided about half way down from the top into two nearly equal divisions, which are again freely forked, with the pinnules and segments obtusely lobed; the whole expanded, but not crested, into a breadth equal to the length of the frond; the lower pinnæ are more or less abnormal and bluntly lobed.

A. m. plumosum (feathery).* *sti.* 3in. to 4in. long. *fronds* 6in. to 15in. long, bi- or tripinnatifid, broadly-lanceolate; pinnæ very variable, closely set, and imbricated, cut nearly to the rachis into ovate or oblong divisions, which are again more or less deeply cut and lobed, the entire frond having a very

elegant appearance.

A. m. ramo-plumosum (branched and feathery).* *fronds* divided nearly to the top of the stipes into two main branches, which are distinctly pinnate; pinnæ distant below, imbricated upwards, cut nearly to the rachis into ovate or oblong lobes, the margins of which are slightly dentated. It is a very handsome form, the width of the frond being greater than its length.

A. m. ramosum (branched). *fronds* from 4in. to 8in. long, branched at the apices; pinnæ oblong, with the margins obtusely-dentate, and slightly undulated.

A. m. sub-bipinnatum (half-bipinnate). *fronds* 6in. to 12in. long, lanceolate; pinnæ distant, deeply lobed, or cut nearly to the midribs. A very rare and pretty variety.

A. m. Thompsonii (Thompson's).* *sti.* 3in. to 4in. long, smooth. *fronds* 6in. to 10in. long, ovate-lanceolate, bipinnatifid; pinnæ closely set, sub-deltoid, unequal-sided, deeply cut into oblong, slightly undulated lobes below, gradually less divided upwards. A very rare and handsome variety. All the forms of *A. marinum* require a very moist atmosphere, consequently they will not thrive in the open air, unless along the sea-coast.

A. maximum (largest). *cau.* erect. *sti.* 2ft. or more long. *fronds* several feet long, 2ft. to 3ft. broad, deltoid-lanceolate, with numerous pinnæ on each side, the lowest 9in. to 18in. long, 4in. to 8in. broad; pinnules sub-sessile, 2in. to 4in. long, ¾in. broad; edge more or less lobed. *sori* medial, the lowest two lines long. North India. Stove species. SYNS. *A. diversifolium* and *Diplazium decurrens*.

A. melanocaulon (black-stiped).* *sti.* 1ft. to 2ft. long. *fronds* 2ft. to 3ft. long, 9in. to 18in. broad; lower pinnæ 4in. to 9in. long, 4in. to 6in. broad; pinnules lanceolate, 2in. to 3in. long, ¾in. broad, cut down two-thirds of the way to the rachis into linear-oblong, falcate, inciso-crenate lobes. *sori* short, oblong, not touching either midrib or edge. Fiji. Stove species. SYN. *Diplazium melanocaulon*.

A. Michauxii (Michaux's).* *cau.* stout. *sti.* 4in. to 8in. long. *fronds* 9in. to 24in. long, 3in. to 9in. broad, ovate-deltoid, bi- or tripinnate; pinnules oblong, deeply serrate, or cut quite to the rachis. United States. A very handsome hardy species, closely related to the Lady Fern, of which it may be only a variety.

A. monanthemum (one-flowered).* *sti.* densely tufted, 3in. to 6in. long. *fronds* 12in. to 18in. long, about 1in.

broad, with twenty to forty horizontal, sessile, sub-dimidiate pinnæ on each side, which are about ½in. long and ¼in. deep, the upper side crenate, suddenly narrowed at the base, the lower more or less distinctly cut away in a straight, or, in the lower pinnæ, decurved line. *sori* linear-oblong, usually one or two, parallel with the lower edge of the pinnæ. Temperate regions of both hemispheres. Greenhouse species.

A. montanum (mountain).* *sti.* tufted, 2in. to 3in. long. *fronds* 2in. to 3in. long, 1in. broad, lanceolate-deltoid; lowest pinnæ distinctly stalked, deltoid, sharply serrated round the outer edge. *sori* short, copious. United States, 1812. Frame or greenhouse species.

A. multisectum (much-cut). Synonymous with *A. aspidioides*.

A. musæfolium (Musa-leaved). A variety of *A. Nidus*.

A. myriophyllum (myriad-leaved). A variety of *A. rhizophyllum*.



Fig. 172. Asplenium Nidus.

A. Nidus (nest).* Bird's-nest Fern. *fronds* undivided, 2ft. to 4ft. long, 3in. to 8in. broad, lanceolate, acute or acuminate at the apex, tapering gradually below into a short stem; the edge entire, the midrib rounded on the back; veins fine and parallel, about ½in. apart. *sori* reaching about half way towards the margin. India, &c., 1820. Syn. *A. australasicum*. See Fig. 172.

A. N. australasicum (Australian). Midrib keeled on the back, often black. Australia, &c. The two former are best treated in the stove; the latter thrives well in the greenhouse. SYN. *Thamnopteris australasicum*.

A. N. musæfolium (Musa-leaved).* *fronds* larger, sometimes 6ft. long, 1ft. broad. *sori* extending nearly to the edge.

A. nitens (shining). *sti.* scattered, 6in. to 9in. long. *fronds* 1½in. to 2in. long, 6in. to 9in. broad, with twelve to twenty ascending or sub-falcate pinnæ on each side, which are 4in. to 6in. long, ½in. to 1in. broad, much acuminated; edge finely toothed, base broadly rounded on the upper, truncate in a curve on the lower side. *sori* in close regular rows, not extending more than half way from the midrib to the edge. Mauritius. Stove species. SYN. *A. macrophyllum*, of gardens only.

A. nitidum (shining).* *sti.* 1ft. long, naked. *fronds* 2ft. to 3ft. long, 6in. to 12in. broad, with many lanceolate-deltoid pinnæ on each side, which are cut down to the rachis into numerous stalked deltoid pinnules, these are again cut into broad fan-shaped cuneate segments, sharply serrated round the outer edge. *sori* short. North India, Ceylon, &c. Greenhouse species.

A. novæ-caledoniæ (New Caledonian).* *sti.* tufted, 6in. to 12in. long. *fronds* 9in. to 12in. long, 6in. to 9in. broad, sub-deltoid, tripinnate; lower pinnæ and pinnules deltoid; segments rigid, scarcely flattened, ½in. or more long, distant, and erecto-patent. *sori* long, linear, marginal. New Caledonia. A rare greenhouse species. SYN. *Darea novæ-caledoniæ*.

A. obtusatum (obtuse). *sti.* tufted, 3in. to 6in. long. *fronds* 6in. to 12in. long, 3in. to 4in. broad, oblong or ovate-deltoid, with a terminal pinna not much longer than the others, and two to six pairs on each side, which are 1in. to 2in. long and about ½in. broad, obtuse, edge crenate, the base truncato-cuneate, shortly stalked. *sori* copious, broad, linear-oblong, falling short of the edge. Peru. *A. difforme* is a variety with an ovate-deltoid frond, and the pinnæ cut quite down to a narrow-winged rachis in the lower part into distinctly separated roundish or oblong-sinuated pinnules. New Zealand, Australia, &c. Greenhouse kinds.

A. o. lucidum (clear).* *fronds* often 2ft. long, with fifteen to twenty pairs of pinnæ on each side, which are more herbaceous in texture, darker green in colour, the lowest 6in. long,

1in. to 1½in. broad, narrowed gradually to a long acuminated point, edge more deeply toothed. Greenhouse variety. SYN. *A. lucidum*.

A. obtusifolium (obtuse-leaved).* *sti.* almost tufted, 6in. to 9in. long. *fronds* 12in. to 18in. long, 4in. to 6in. broad, ovate-lanceo-late, with twelve to twenty stalked horizontal pinnæ on each side, which are 2in. to 3in. long, ½in. to ¾in. broad, acute; edges slightly undulato-crenate, the upper side with a distinct auricle at the base, and then narrowed suddenly, the lower side obliquely truncate. *sori* distant, in two regular rows, falling short of the edge. West Indies, &c., 1838. Stove species.

A. obtusilobum (obtuse-lobed).* *sti.* tufted, 2in. to 4in. long. *fronds* 4in. to 6in. long, 1½in. to 2in. broad, with nine to twelve sub-deltoid pinnæ on each side, of which only the inner third on the lower side is cut away, the largest nearly 1in. long, ¾in. broad; lowest pinnules ⅜in. deep, flabellately cut into three to five linear blunt lobes. *sori* sub-marginal. New Hebrides, 1861. A very pretty little stove species. SYN. *Darea obtusiloba*.

A. odontites (much-toothed). Synonymous with *A. flaccidum*.

A. oxyphyllum (sharp-leaved).* *sti.*

firm, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, lanceolate, with several pinnæ on each side, which are 3in. to 6in. long, 1in. to 2in. broad; pinnules lanceolate, in the larger forms again pinnatifid; teeth mucronate. *sori* in two rows on the pinnæ or pinnules midway between the midrib and edge. Himalayas. A very variable greenhouse species. SYNS. *Athyrium oxyphylla* and *Lastrea eburnea*.

A. paleaceum (scaly).* *sti.* densely tufted, 1in. to 3in. long, spreading, densely scaly. *fronds* 6in. to 9in. long, 1½in. to 2in. broad, sometimes proliferous and rooting at the apex, with twelve to twenty sub-sessile pinnæ on each side, which are 1in. long, about ½in. broad, bluntish; edge inciso-dentate, the upper base auricled and narrowed suddenly, the lower obliquely-truncate; the lower ones stalked, and nearly as broad as long. *sori* linear, extending nearly to the edge. Tropical Australia. Stove or warm greenhouse species.

A. palmatum (palmate). Synonymous with *A. Hemionitis*.

A. parvulum (small). Synonymous with *A. trilobum*.

A. persicifolium (Peach-leaved). *sti.* and *rachis* grey, with a few scattered minute grey scales. *fronds* oblong-lanceolate, 2ft. to 3ft. long, often

gemmiferous at the apex; pinnæ ascending, fifteen to thirty-jugate, sub-petiolate, 4in. to 5in. long, linear-ligulate-acuminate, ½in. to ¾in. broad, distinctly crenate throughout. *sori* regular, reaching nearly to midrib and edge. Philippine and Sandwich Isles. Stove species.

A. Petrarchæ (Petrarch's).* *sti.* densely tufted, 1in. to 2in. long. *fronds* 2in. to 3in. long, ½in. broad, linear-lanceolate, with six to ten horizontal sessile pinnæ on each side, which are ¼in. long and nearly as much broad, cordate-ovate, blunt; edge sinuated; the base unequal, slightly truncate on the lower side. *sori* oblong, very short, four to six on each side of the midrib. South Europe, 1819. A very rare little gem, best treated in a cool house.

A. pinnatifidum (pinnatifid). *sti.* tufted, 2in. to 4in. long. *fronds* 3in. to 6in. long, 1in. or more broad at the base, lanceolate-deltoid, with a long, gradually narrowing point, which is sinuated only; the lobes below this ¼in. to ½in. deep; the lowest ovate-oblong, ½in. deep by nearly as broad, sinuated and reaching down nearly to the rachis. *sori* copious. Pennsylvania. Greenhouse or sheltered places outside.

A. planicaule (flat-stiped).* *sti.* tufted, 3in. to 6in. long, naked. *fronds* 6in. to 12in. long, 2in. to 3in. broad, with twelve to twenty stalked horizontal pinnæ on each side, which are 1in. to 1½in. long, ¼in. to ⅜in. broad, acute; edge lobed about half-way down, and deeply serrated. *sori* copious, reaching nearly to the edge. Himalayas, up to 6000ft., &c., 1841. Greenhouse species.

A. plantagineum (Plantain-like). *sti.* tufted, 6in. to 9in. long. *fronds* 6in. to 9in. long, 2in. to 3in. broad, simple, acuminate, base rounded; edge slightly undulato-dentate upwards, sometimes lobed towards the base. *sori* slender, linear, sometimes nearly touching both edge and midrib. West Indies, &c., 1819. Stove species. SYN. *Diplazium plantagineum*.

A. polyphyllum (many-leaved). Synonymous with *A. acuminatum*.

A. præmorsum (bitten). Synonymous with *A. furcatum*.

A. prolongatum (prolonged). Synonymous with *A. rutæfolium*.

A. pulchellum (pretty).* *sti.* tufted. 1in. to 2in. long. *fronds* 3in. to 6in. long, 1in. to 1½in. broad, with twelve to eighteen pinnæ on each side, which are ½in. to ¾in. long, two lines to three lines broad,

bluntish, almost dimidiate; the upper edge crenate, and narrowed suddenly at the base. *sori* linear, oblique, falling short of the edge. Tropical America. Stove species.

A. pumilum (small). *sti.* tufted, 3in. to 4in. long. *fronds* 4in. to 6in. each way, deltoid, the upper part sinuated only, the lower cut down to the rachis into distinct pinnæ, of which the lowest pair are much the largest; the pinnules on the lower side sometimes 2in. long, reaching down to a slightly winged rachis, acuminate and deeply lobed. *sori* very oblique, the lower ones sometimes 1in. long. West Indies, &c., 1823. A very rare and pretty stove species.

A. rachirhizon (rachis-rooting). A variety of *A. rhizophorum*.





FIG. 173. ASPLENIUM RADICANS.

A. radicans (rooting). *cau.* erect, sub-arborescent. *sti.* 1ft. to 2ft. long, tufted. *fronds* 3ft. to 5ft. long, 2ft. to 3ft. broad, deltoid; lower pinnæ 12in. to 18in. long, 6in. to 8in. broad; pinnules lanceolate, sessile, the upper ones entire, lower ones 3in. to 4in. long, ¾in. to 1in. broad, with blunt lobes, ¼in. broad, reaching about half way down to the rachis. Lower *sori* sometimes ¼in. long. Tropical America. A very variable species. SYNS. *A. giganteum*, *Diplazium radicans*, *D. umbrosum*, &c. See Fig. 173.

A. refractum (refracted). A variety of *A. fontanum*.

A. resectum (cut or pared).* *sti.* scattered, 4in. to 8in. long. *fronds* 6in. to 15in. long, 2in. to 4in. broad, lanceolate-oblong, with ten to thirty sub-sessile horizontal pinnæ on each side, which are 1in. to 3in. long, ¼in. to ½in. broad, almost dimidiate, the point bluntish, all except the truncate part crenate, the upper half at the base narrowed nearly at a right angle. *sori* not reaching either the midrib or edge. India, &c., widely distributed, 1820. Greenhouse species.

A. rhizophorum (root-bearing).* *sti.* tufted, 4in. to 8in. long. *fronds* 1ft. to 2ft. long, 4in. to 6in. broad, elongated, and rooting at the apex; pinnæ twelve to thirty on each side, sub-sessile, 1½in. to 2in. long, about ½in. broad, inciso-dentate throughout; the two sides unequal, the upper one auricled and narrowed, the lower one obliquely cuneate. *sori* not reaching either to the edge or midrib. Tropical America. A very variable stove species. *A. r. rachirhizon*, has distinctly separated oblong-rhomboidal pinnules, again deeply cut into narrow segments.

A. rhizophyllum (leaf-rooting). *sti.* tufted, 2in. to 6in. long. *fronds* 6in. to 12in. long, 1½in. to 2in. broad, cut down into numerous close-

placed horizontal pinnæ on each side; central ones 1in. long, ¼in. to ⅜in. broad, cut down throughout nearly to the centre into simple or forked erecto-patent pinnules, the lowest on the under side suppressed. *sori* solitary, sub-marginal. *A. r. myriophyllum* is a variety with broader fronds; central pinnæ 1½in. long, with lower pinnules cut down into several simple or forked linear segments. North America, &c., 1680. Both handsome greenhouse kinds.

A. rutæfolium (Rue-leaved).* *sti.* tufted, 4in. to 9in. long. *fronds* 6in. to 15in. long, 2in. to 4in. broad, ovate deltoid, with twelve to twenty pinnæ on each side, the lowest sub-deltoid, 2in. or more long, cut down to the rachis into numerous erecto-patent distant pinnules on each side, the lowest on the upper side again cut down into erecto-patent linear segments. *sori* small, marginal. Cape Colony. A beautiful greenhouse species. SYNS. *A. prolongatum* and *Darea rutæfolia*.

A. Ruta-muraria (Wall-rue).* *sti.* tufted, 2in. to 4in. long. *fronds* 1in. to 2in. long, about 1in. broad, deltoid, cut down to the rachis into a few pinnæ on each side, the lower ones again cut down into spathulato-cuneate pinnules, which are serrated round the outer edge. *sori* copious.

Great Britain, and almost worldwide in its distribution. Hardy species. This requires a well-drained position, and a soil composed mainly of old mortar rubbish.

A. salicifolium (Willow-leaved). *sti.* tufted, 6in. to 12in. long. *fronds* 12in. to 18in. long, 6in. to 9in. broad, oblong, with a terminal pinna and four to ten distinctly stalked ones on each side, which are 4in. to 6in. long, ¾in. to 1in. broad, acuminate; edge usually entire, the base equally truncato-cuneate on both sides. *sori* falling short both of the edge and midrib. West Indies, &c. Stove species.

A. Sandersoni (Sanderson's).* *sti.* tufted, 1in. to 2in. long. *fronds* 6in. to 9in. long, ½in. to ¾in. broad, linear, often gemmiferous at the apex, with twelve to twenty horizontal dimidiate pinnæ on each side, which are deeply crenate on the upper edge, and at the base narrowed suddenly into a winged petiole, the lower one nearly straight and quite entire. *sori* oblong. Natal, &c. A very rare greenhouse species.

A. schizodon (cut-toothed). Synonymous with *A. Vieillardii*.

A. Schkuhrii (Schkuhr's). *cau.* erect. *sti.* 1ft. to 1½ft. long. *fronds* deltoid, 1½ft. to 2ft. long, tripinnatifid; lower pinnæ distant, oblong-

lanceolate, 6in. to 8in. long, 1½in. to 2in. broad, rachis winged to base; pinnules ligulate-oblong, ⅜in. broad, sessile, cut into shallow, close, oblong blunt lobes. *sori* ⅛in., medial in a single row in the pinnules. Ceylon. Stove species. SYN. *Diplazium Schkuhrii*.

A. Selosii (Selose's).* *sti.* densely tufted, 1in. to 2in. long, wiry. *fronds* ½in. to ¾in. long, palmately cleft, usually into three nearly equal forks, which are about one line broad, the edge slightly inciso-serrate. *sori* copious, ultimately occupying the whole surface. Tyrol and Carinthia. A very rare and curious little species, requiring the protection of the frame or cool house; it should be firmly potted between pieces of sandstone in loam, leaf-soil, rock chippings and sand, with good drainage.

A. septentrionale (northern).* *sti.* densely tufted, 3in. to 4in. long. *fronds* simple, or cleft from the apex into two or three cuneate divisions, 1in. to 1½in. long, one line broad, with a few sharp lateral and terminal teeth. *sori* elongated, copious, often at last hiding the whole under surface. Great Britain, and widely distributed in both hemispheres. This rare little species requires to be securely planted in a well-drained elevated chink of the

fernery outside, in loamy, gritty soil.

A. Shepherdi (Shepherd's).* *sti.* tufted, 1ft. long. *fronds* 12in. to 18in. long, 6in. to 9in. broad; lower pinnæ stalked, 4in. to 6in. long, 1in. to 1½in. broad, point acuminate, edge lobed above, ¼in. broad, somewhat toothed. *sori* linear, not reaching the edge. South America. Stove species. SYN. *Diplazium Shepherdi*.

A. S. inæquilaterum (unequal-sided). *fronds*, texture firm, colour duller than that of the type; pinnæ much acuminated; the lobes deeper, more uniform, and falcate, the two sides unequal, the lower one unequally truncate at the base.

A. spathulinum (spathulate). A synonym of *A. affine*.

A. spinulosum (very spiny).* *sti.* 6in. to 12in. long, scattered. *fronds* 9in. to 12in. each way, deltoid, tri- or quadripinnatifid, with nine to twelve pinnæ on each side, the lowest much the largest, 6in. to 9in. long, 2½in. to 3in. broad, ovate-lanceolate; pinnules lanceolate, cut down to the rachis on each side into six to nine oblong-rhomboidal mucronate segments, two lines long, one line broad, which are sharply toothed. *sori* two to ten to a segment, usually round, but occasionally oblong. Amur-land, &c. Greenhouse species. SYN. *Athyrium*

spinulosum and *Cystopteris spinulosa*.

A. splendens (splendid). *rhiz.* creeping, scaly. *sti.* 6in. to 9in. *fronds* deltoid, 6in. to 1ft. long, two to three-pinnate; lower pinnæ stalked, deltoid, 1in. to 2in. broad, pinnate or bipinnate; segments cuneate-flabellate, ¼in. to ½in. broad, slightly lobed, sharply toothed round outer edge. *sori* copious, slender, irregular, reaching from base nearly to tip of segments. Cape Colony. A very rare greenhouse species.

A. subsinuatum (half-waved). Synonymous with *A. lanceum*.

A. sundense (Sundanese). Synonymous with *A. vittæforme*.

A. sylvaticum (woods). *cau.* decumbent. *sti.* 1ft. long. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad, ovate-lanceolate, with numerous spreading pinnæ, the largest 3in. to 4in. long, ½in. to ¾in. broad, acuminated; edge broadly and briefly lobed; base narrowed suddenly on both sides. *sori* in long slender lines, reaching nearly to the edge. India, &c. Stove species.

A. thelypteroides (Thelypteris-like). *sti.* 1ft. long. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, lanceolate, with numerous spreading pinnæ, the lower ones 4in. to 6in. long, 1in. broad, cut down to a broadly-winged

rachis into numerous nearly entire elliptical spreading pinnules. *sori* in close regular rows, reaching nearly from the midrib to the edge, slightly curved, the lower ones often double. North America, &c., 1823. Hardy or cool house species. SYN. *Athyrium thelypteroides*.

A. Thwaitesii (Thwaites's).* *rhiz.* wide-creeping, stout. *sti.* 6in. long, slender, densely clothed with strong white woolly hairs. *fronds* 1ft. or more long, 4in. to 6in. broad, with eight to ten distinct pinnæ beneath the pinnatifid apex, the largest 3in. long, ⅝in. broad, cut down two-thirds of the way to the rachis in oblong crenulated lobes, ¼in. deep, two lines across. *sori* reaching half-way to the edge, the lowest about one line long. Ceylon. Very fine stove species. SYN. *Diplazium Thwaitesii*.



FIG. 174. ASPLENIUM TRICHOMANES.

A. Trichomanes (maiden-hair).* Maidenhair Spleenwort. *sti.* densely tufted, 1in. to 4in. long. *fronds* 6in. to 12in. long, about ½in. broad, with fifteen to thirty opposite pairs of sessile horizontal pinnæ, which are ¼in. to ⅜in. broad, one and a-half to two lines deep, edge slightly crenate, the two sides unequal, the upper one the broadest, and narrowed suddenly at the base. *sori* linear-oblong, three to six on each side of the midrib. Great Britain, and almost cosmopolitan. Hardy species. See Fig. 174. There are several varieties in cultivation, of which the following are the most important:

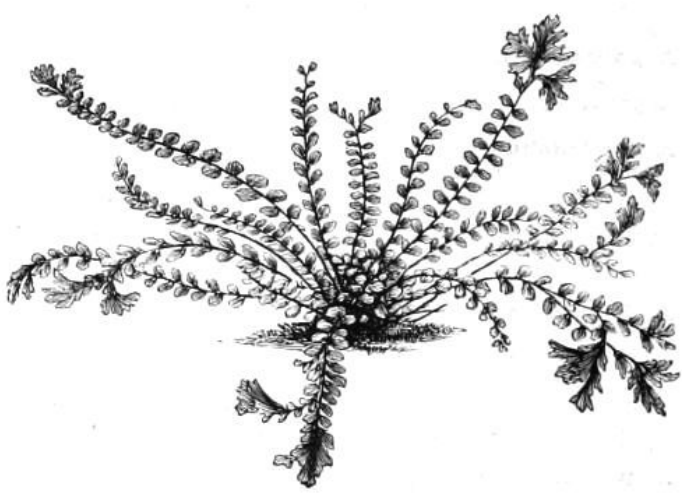


FIG. 175. ASPLENIUM TRICHOMANES CRISTATUM.

A. T. cristatum (crested).* *fronds* 4in. to 6in. long, simply pinnate, with roundish pinnæ, and broad crests at their extremities, sometimes divided, each fork crested. A very pretty little variety, requiring frame or greenhouse treatment. See Fig. 175.

A. T. incisum (deeply-cut).* *fronds* 3in. to 6in. long; pinnæ deeply pinnatifid, the lobes again deeply cut or serrated. A very rare and pretty form.

A. T. multifidum (much-divided).* *fronds* 3in. to 6in. long, once, twice, thrice, or, rarely, quadri-furcate, each division terminated with a little crest. A free-growing kind.

A. T. ramosum (branched).* *fronds*

5in. to 8in. long, freely branched, each division being again forked; pinnæ deeply cut or crenated, or serrate. More hardy than any of the other forms.

A. trilobum (three-lobed).* *sti.* tufted, 2in. to 3in. long. *fronds* 1in. to 1½in. long, 1in. broad, rhomboidal, apex acute, base cuneate, entire, the margin undulato-crenate, or the lower part deeply lobed, with broad inciso-crenate divisions. *sori* broad and short. Chili and South Brazil. A very rare little stove species. SYN. *A. parvulum*.

A. umbrosum (shady). *sti.* 1ft. or more long, scaly at the base. *fronds* 2ft. to 5ft. long, 12in. to 18in. broad, ovate-deltoid; pinnæ ovate-lanceolate, 6in. to 9in. long, 3in. to 6in. broad, with lanceolate pinnules, which are again cut down to the midribs into unequal-sided rhomboidal lobes, with the margins sharply crenated. *sori* copious, oblong, with large tumid membranous involucres. Madeira, Canaries, Himalayas, &c. Very widely distributed. A very handsome greenhouse species. SYNS. *Allantodia australe*, *Athyrium umbrosum*.

A. varians (variable). *sti.* tufted, 1in. to 3in. long. *fronds* 4in. to 6in. long, 1in. broad, oblong-lanceolate, with

eight to twelve pairs of pinnæ on each side, lower ones sub-deltoid, ½in. to ¾in. long, ¼in. broad, cut down to the rachis into a few cuneato-flabellate pinnules, the lowest two lines across, sharply toothed on the outer edge. *sori* copious, when mature, covering nearly the whole under surface of the pinnules. Himalayas, and widely distributed. Greenhouse species.

A. Veitchianum (Veitch's). Synonymous with *A. Belangeri*.

A. Vieillardii (Vieillard's).* *sti.* tufted, 4in. to 6in. long. *fronds* 6in. to 9in. long, 6in. to 8in. broad, with large linear-lanceolate terminal pinna, lengthened out at the point, and deeply serrated, and three to four pairs of erecto-patent similar lateral ones, which are 3in. to 4in. long, upwards of ½in. broad, equally truncato-cuneate, and the lower ones slightly stalked at the base. *sori* distant, falling short of both edge and margin. New Caledonia. A very graceful greenhouse species. SYN. *A. schizodon*. *A. apicidens* is but a variety of this, with shortened sori and more obtuse venation.

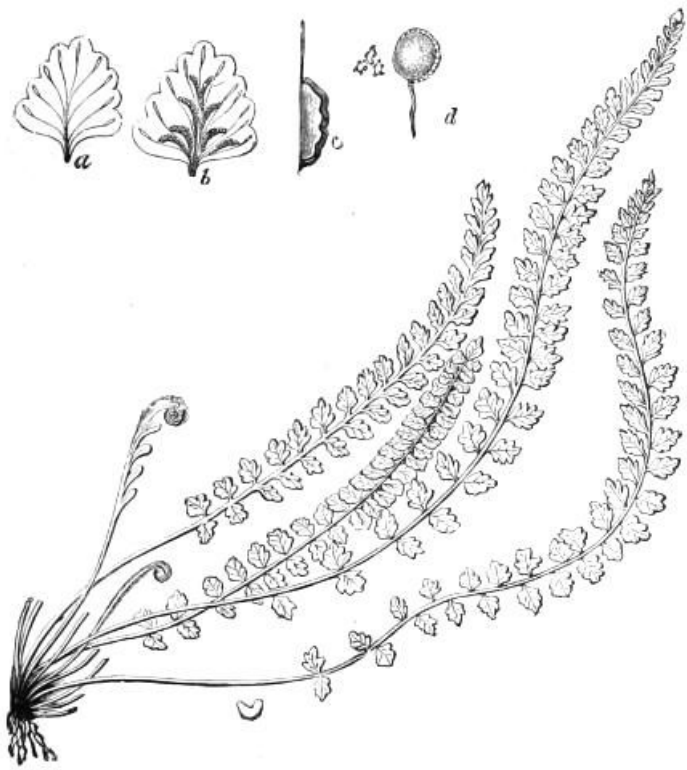


Fig. 176. Asplenium viride, showing Barren and Fertile Pinnæ (*a* and *b*), Sorus (*c*), and Sporangium (*d*).

A. viride (green). Green Spleenwort.* *sti.* densely tufted, 2in. to 4in. long. *fronds* 4in. to 6in. long, ½in. broad, with twelve to twenty sub-sessile pinnæ on each side, ovate-rhomboid; upper edge narrowed suddenly at the base, the lower one obliquely truncate, outer part deeply crenated. *sori* copious, linear-oblong, oblique. Great Britain, &c., widely distributed in both hemispheres. It requires to be

planted in a well-drained but moist situation. Hardy species. See Fig. 176.

A. vittæforme (narrow-fronded).* *rhiz.* creeping. *sti.* short, erect. *fronds* entire, lanceolate, 12in. to 18in. long, 1½in. to 3in. broad, narrowed to an acute point, and very gradually into the stem below; margin obscurely toothed. *sori* copious, often reaching from the midrib nearly to the edge. Java, &c. Stove species. SYN. *A. sundense*.

A. viviparum (plant-bearing).* *sti.* tufted. 6in. to 9in. long. *fronds* 1ft. to 2ft. long, 6in. to 8in. broad, ovate-lanceolate, with numerous close-placed erecto-patent pinnæ on each side, which are 3in. to 4in. long, 1½. to 2in. broad, cut down to a compressed rachis into numerous pinnatifid pinnules, the lower segments of which are again forked; ultimate segments ¼in. to ⅜in. long, quarter-line broad. *sori* solitary, marginal. Mauritius, &c., 1820. A very handsome stove species.

A. vulcanicum (volcanic). *sti.* 6in. to 9in. long. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad, oblong-lanceolate, with a linear-terminal pinna, or gemmiferous at the apex, and six to twelve lateral ones on each side; lower ones stalked, 2in. to 4in. long, ¾in. to 1in. broad, acuminated; edge

slightly dentate; the base truncate. *sori* very regular and parallel, falling short of the edge. Malay Islands. Stove species. SYN. *A. heterodon*.

A. zeylanicum (Ceylonese).* *sti.* scattered, 4in. to 8in. long. *fronds* 6in. to 12in. long, 1in. to 2in. broad, the point acuminated, apex slightly lobed, the lower two-thirds more deeply so, and the base quite down to the rachis; lobes blunt, ¼in. to ½in. across. *sori* linear, two to three lines long. Ceylon. Stove species. SYN. *Diplazium zeylanicum*.

ASSONIA (commemorative of Ignatius de Asso, a distinguished Spanish botanist, who wrote on the plants of Arragon). ORD. *Sterculiaceæ*. This genus is now included by best authorities under *Dombeya*. Ornamental stove evergreen trees, with undivided leaves, and axillary, bifid, sub-corymbose peduncles. They are of easy culture; thriving freely in any light rich soil, or a mixture of loam and peat. Young cuttings will root freely in sand, with a brisk bottom heat, if covered by a bell glass.

A. populnea (Poplar-leaved). *fl.* white, disposed in a terminal, bifid corymb; peduncles scarcely longer than the petioles. June. *l.* cordate, acuminated, smooth, a little serrated. *h.* 10ft. to 20ft. Bourbon, 1820.

A. viburnoides (Viburnum-like). *fl.* white; peduncles three times longer than the petioles. *l.* cordate,

somewhat acuminate, crenated, tomentose beneath, as well as younger leaves. *h.* 10ft. to 20ft. Bourbon, 1822.

ASTARTEA (a mythological name: Astarte, the Syrian Venus). ORD. *Myrtaceæ*. An ornamental greenhouse evergreen shrub, requiring a mixture of loam, peat, leaf soil, and sand. Young cuttings root readily in sand under a bell glass in gentle heat.

A. fascicularis (bundle-flowered). *fl.* white, pedicellate, solitary, axillary. May. *l.* opposite, linear, fleshy; when young, disposed in axillary fascicles. *h.* 6ft. to 9ft. West Australia, 1830.

ASTELMA (from *a*, not, and *stelma*, a crown; in reference to the construction of the fruit). ORD. *Compositæ*. Greenhouse evergreen shrubs from the Cape of Good Hope. Some species of this genus, which is now generally referred to *Helipterum*, are very handsome, and thrive well in a mixture of fibrous peat, leaf soil, and sand, with thorough drainage. Fill the pots one-third full of crocks; water carefully, and only when absolutely necessary; and place in a situation near the glass, allowing a free admission of air. Seeds should be sown in pots of light, open soil, and placed in a gentle heat; half-ripened cuttings will strike readily in sandy soil with a hand glass placed over them. They are now but rarely seen under cultivation.

A. canescens (hoary). *fl.-heads* purple; scales of involucre ovate; branches one-flowered. May to June. *l.* oblong, blunt, imbricated. *h.* 1½ft.

1794.

A. eximium (fine).* *fl.-heads* crimson; corymbs sessile. July. *l.* sessile, ovate, close, erect, white with thick woolly pubescence. Stem stout. *h.* 3ft. 1793. This is a very beautiful species.

A. speciosissimum (showiest). *fl.-heads* white, large, solitary, terminal. July. *l.* sessile, lanceolate-obovate, acute, three-nerved, woolly. *h.* 8ft. 1691.

ASTEPHANUS (from *a*, without, and *stephanos*, a corona; corona absent). ORD. *Asclepiadeæ*. A genus of pretty evergreen greenhouse twiners. Flowers few, small, disposed in interpetiolar umbels; corolla campanulate. Leaves small, opposite. They thrive in a compost of turfy peat, leaf soil, and loam, in equal parts. Very little water is required when the plants are at rest. Cuttings root readily in sandy soil in a moderate heat. Propagation may also be effected by division.

A. linearis (linear). *fl.* white; umbels dividing in threes, lateral and terminal. July. *l.* 1in. long, opposite, linear-lanceolate. Stem glabrous. Cape of Good Hope, 1816.

A. triflorus (three-flowered).* *fl.* white; umbels generally three-flowered. July. *l.* opposite, lanceolate, villous beneath. Stems hairy. Cape of Good Hope, 1816.

ASTER (from *aster*, a star; general shape of flower-heads). Michaelmas Daisy; Star-wort. SYN. *Pinardia* (of Necker). ORD. *Compositæ*. Hardy herbaceous perennials, except where otherwise stated. Heads solitary, corymbose, or panicled, heterogamous, rayed; ray florets pistiliferous, one or two-seriate, fertile or neuter; ligule elongated, white, blue, or purple; disk florets hermaphrodite, fertile, tubular, yellow, five-cleft; involucre campanulate or hemispheric; bracts few or many-seriate, outer smaller or larger; receptacle flat or convex; pappus hairs few or copious, scabrid, outer sometimes shorter, rigid, and paleaceous. Leaves alternate. This large genus contains many handsome border and alpine deciduous perennials (rarely biennials) of easy culture in ordinary soil. They may be propagated by divisions in autumn or spring, or by seeds in spring. The greenhouse species are mostly evergreen shrubs, requiring a compost of peat, leaf soil, and loam. Cuttings root readily in a sandy soil, under a hand glass, with very little heat.

A. acris (acrid). *fl.-heads* blue; involucre imbricated, twice as short as the disk. August. *l.* linear-lanceolate, not dotted, three-nerved. *h.* 2ft. South Europe, 1731.

A. acuminatus (taper-pointed).* *fl.-heads* white; panicle corymbose. September. *l.* broad-lanceolate, narrowed at base, entire, with a very long point. Stem simple, flexuous, angular. *h.* 2ft. North America, 1806.

A. adulterinus (false). *fl.-heads* violet; involucre squarrose, shorter than the disk. September. *l.*

amplexicaul, lanceolate; lower ones sub-serrate, smooth; those of the branches linear squarrose. *h.* 3ft. North America.

A. æstivus (summer-flowering).* *fl.-heads* blue. July. *l.* lanceolate, somewhat amplexicaul, narrowed at the end, scabrous at edge. Stem erect, hispid; branchlets pilose. *h.* 2ft. North America, 1776.

A. albescens (whitish). *fl.-heads* purple or whitish, nearly 1in. across; corymbosely panicled; scales of involucre ovate-linear, apiculate; ray twenty-flowered. August. *l.* lanceolate on short petioles, denticulate, downy. Plant beset with rusty down. *h.* 3ft. Nepal, 1842.

A. alpinus (alpine).* *fl.-heads* bright purple, 1in. to 2in. across; scales of involucre nearly equal, lanceolate, bluntish. July. *l.*, radical ones lanceolate-spathulate; those of the stem lanceolate. Stem one-flowered. *h.* 6in. to 9in. Europe, 1658. A very attractive species, having a dwarf, stout habit; it forms a useful and handsome subject for edging, and its flowers are valuable for cutting purposes. See Fig. 177.

A. a. albus (white).* *fl.-heads* white, in other respects resembling the type; but it is much less desirable, and has not nearly so vigorous a habit. Europe, 1827.

A. altaicus (Altaian).* *fl.-heads* blue-purple, about 2in. across; stem simple, corymbose, downy. June, July. *l.* linear-lanceolate, entire, blunt mucronate, three-nerved at base, veiny. *h.* 1ft. Siberia, 1804. This, which is frequently considered a variety of *A. alpinus*, is one of the handsomest.

A. alwartensis (Alwart). *fl.-heads* red; ray very fine; involucre loosely squarrose. May. *l.* ovate, narrowed at base, entire, about five-nerved. *h.* 1ft. Caucasus, 1807.

A. Amellus (Amellus).* *fl.-heads* purple, solitary, numerous; involucre imbricated squarrose; leaves blunt; inner membranous, coloured at edge. August. *l.* oblong-lanceolate, scabrous. *h.* 2ft. Italy, 1596. One of the best border kinds.



FIG. 177. ASTER ALPINUS.

A. A. bessarabicus (Bessarabian).* A most desirable variety, frequently seen in gardens; it is rather taller than the type, with larger flower-heads, of a deep purple colour. One of the showiest of all the Asters. See Fig. 178.



FIG. 178. ASTER AMELLUS BESSARABICUS.

A. amplexicaulis (stem-clasping). *fl.-heads* violet. July. *l.* ovate-oblong, acute, amplexicaul, cordate, serrated, smooth. Stem panicled, smooth; branches one to two-headed. *h.* 3ft. North America.

A. amygdalinus (Almond-leaved). *fl.-heads* white; involucre closely imbricated. August. *l.* lanceolate, narrowed at base, acuminated, scabrous at edge. Stem simple,

corymbose at end. *h.* 2ft. North America, 1759.

A. argenteus (silvery).* *fl.-heads* purple. August. *l.* oblong-lanceolate, silky, sessile. Stem slender, decumbent, loosely branched; branches and branchlets one-headed. *h.* 1ft. North America, 1801.

A. bellidiflorus (Daisy-flowered). *fl.-heads* pale red; involucre with spreading scales. September. *l.* amplexicaul, narrow-lanceolate, scabrous above, lower sub-serrated. Stem much branched. *h.* 3ft. North America.

A. Bigelovii (Bigelow's).* *fl.-heads* corymbose, 2½in. diameter, ray-florets lilac, disk yellow. Summer. *l.* scabrous pubescent, oblong-spathulate; cauline ones amplexicaul, ovate-oblong, crenate, obscurely-toothed. *h.* 2½ft. Colorado, 1878. A very handsome biennial species. SYN. *A. Townshendi*.

A. blandus (charming). *fl.-heads* pale purple; racemes scarcely longer than the leaves. October. *l.* sub-amplexicaul, oblong-lanceolate, acuminate, sessile, smooth. Stem pyramidal. *h.* 2ft. North America, 1800.

A. canescens (hoary). *fl.-heads* pale purple; involucre imbricated, very acute, longer than disk. September.

l. linear. Panicle corymbose, much branched, leafy. *h.* 2ft. North America, 1812. Biennial or perennial.

A. cassiarabicus (Arabian Cassia). *fl.-heads* pink; panicles corymbose. September. *l.* ovate, acute, serrated, tapering at the petioles. Plant erect, pilose. *h.* 2ft. Russia, 1834.

A. caucasicus (Caucasian).* *fl.-heads* purple, solitary; scales of involucre nearly equal, linear. July. *l.* ovate, sessile, scabrous. *h.* 1ft. Caucasus, 1804.

A. ciliatus (ciliated). *fl.-heads* white. September. *l.* ciliated; cauline ones linear-lanceolate, nerved; those of the branches very short lanceolate, three-nerved. Stem branched, downy; branches downy. *h.* 3ft. North America.

A. concinnus (neat).* *fl.-heads* purple; involucre closely imbricated. October. *l.* sub-amplexicaul, lanceolate; lower ones sub-serrate, smooth. Stem simple, panicled at end. *h.* 2ft. North America, 1800.

A. concolor (one-coloured). *fl.-heads* purple; raceme terminal. October. *l.* oblong-lanceolate, hoary on each side. Stem simple, erect, downy. *h.* 1ft. North America, 1759.

A. conyzioides (Conyza-like). Synonymous with *Seriocarpus*

conyzioides.

A. cordifolius (heart-leaved). *fl.-heads* blue, small, disposed in crowded racemes, which are slightly drooping. July. *l.* cordate, pilose beneath, finely serrated, stalked. Stem smoothish, panicled; panicle spreading. *h.* 2ft. North America, 1759.

A. coridifolius (Coris-leaved). *fl.-heads* pale blue. October. *l.* very numerous, linear, blunt, reflexed, hispid at edge. Stem branched, diffuse, smooth; branches one-headed. *h.* 1ft. North America.



Fig. 179. Aster corymbosus, showing Habit and Flower-head.

A. corymbosus (corymbose). *fl.-heads* corymbose, about 1in. in diameter; ray-florets few, narrow, white; disk-florets pale yellow. Autumn. *l.* 3in. long, cordate acute, lobed at the base, coarsely toothed. Stems brittle, blackish purple. *h.* 2ft. to 3ft. Syn. *Biotia corymbosa*. See Fig. 179.

A. diffusus (diffuse). *fl.-heads* white; involucres imbricated. October. *l.* elliptic-lanceolate, equal, serrated, smooth. Branches spreading. Stem pubescent. *h.* 2ft. North America, 1777.

A. Douglasii (Douglas's).* *fl.-heads* purple; involucral scales linear or spathulate-linear, loosely imbricated. August. *l.* lanceolate, acute, entire, or rarely serrate, mostly tapering at the base. Stem smooth, slender, paniculately branched, leafy. *h.* 3ft. to 4ft. California, &c.

A. dracunculoides (Tarragon-like).* *fl.-heads* white, about 1in. across, disposed in dense cymose clusters; involucre imbricated. September, October. *l.* linear, acuminated, entire; lower ones linear-lanceolate, sub-serrate. Branches corymbose. *h.* 3ft. North America, 1811. A very handsome species.

A. dumosus (bushy).* *fl.-heads* white, about ½in. across, disposed in broad clusters; involucre cylindrical, closely imbricated. October. *l.* linear, glabrous; those of the branches very short. Branches panicled. *h.* 2ft. North America, 1734.

A. d. albus (white).* *fl.-heads* quite white, and rather smaller than those of the species. North America.

A. d. violaceus (violet). *fl.-heads* violet-purple. North America.

A. elegans (elegant). *fl.-heads* blue, small; corymb contracted, drooping; scales of involucre oblong-cuneate, blunt, squarrose. September. *l.* scabrous; cauline ones oblong-lanceolate, acute; radical ones oblong, stalked. *h.* 2ft. North America, 1790. A very elegant species, having a graceful habit.

A. eminens (eminent). *fl.-heads* light blue. October. *l.* linear-lanceolate, acuminate, scabrous at edge; lower ones sub-serrated. Stem panicled; branches one-headed. *h.* 2ft. North America.



Fig. 180. Aster ericoides.

A. ericoides (Heath-like).* *fl.-heads* white; involucre squarrose, leaflets acute. September. *l.* linear, glabrous; those of the branches subulate, close together; and those of the stem long. *h.* 3ft. North America, 1758. A very pretty species. See Fig. 180.

A. floribundus (many-flowered).* *fl.-heads* light purple. September. *l.* sub-amplexicaul, lanceolate; lower

ones serrated. Stem smooth; branches corymbose. *h.* 4ft. North America.

A. foliosus (leafy). *fl.-heads* pale blue; involucre imbricate. September. *l.* linear-lanceolate, acuminate, narrowed at each end. Stem downy, panicled, erect; branches few-headed. *h.* 3ft. North America, 1732.

A. fragilis (fragile). *fl.-heads* flesh-coloured, small; involucre imbricated. September. *l.* linear, acuminate, entire; radical ones oblong, serrate. Branches in corymbose panicles. *h.* 2ft. North America, 1800.



FIG. 181. ASTER GRANDIFLORUS.

A. grandiflorus (large-flowered).* *fl.-heads* purple, large, terminal; scales of involucre squarrose. November. *l.* linear, rigid, acute, sub-amplexicaul; those of the branches reflexed, hispid at edge. *h.* 2ft. North America, 1720. See Fig. 181.

A. hyssopifolius (Hyssop-leaved).* *fl.-heads* white, or purple shaded;

scales of the involucre about half as long as the disk. August to October. *l.* linear-lanceolate, acute, with the margins scabrous. Branches fastigiate and corymbose, smooth. *h.* 1½ft. to 2ft. North America.

A. lævigatus (smooth-stemmed). *fl.-heads* flesh-coloured, about 1in. across, disposed in large panicles. September. *l.* sub-amplexicaul, broad-lanceolate, sub-serrate, smooth. Stem glabrous. Branches many-headed. *h.* 3ft. North America, 1794.

A. lævis (smooth).* *fl.-heads* blue; involucre imbricated with cuneiform leaflets. September. *l.* sub-amplexicaul, remotely oblong, entire, lucid; radical ones sub-serrated. *h.* 2ft. North America, 1758. One of the best border species.

A. laxus (loose-flowered). *fl.-heads* white, about 1in. across; clusters loose. October. *l.* linear-lanceolate, scabrous at edge; lower ones sub-serrated; stem ones reflexed. Stem loosely panicled. *h.* 2ft. North America.

A. linarifolius (Toad-flax-leaved). *fl.-heads* pale blue. September. *l.* numerous, linear, mucronated, nerveless, not dotted, keeled, scabrous, rigid. Branches fastigiate, one-headed. *h.* 1ft. North America, 1699.

A. linifolius (Flax-leaved). *fl.-heads* white; involucre imbricated, short. July. *l.* linear, nerveless, dotted, scabrous, reflexed, spreading. Branches corymbose, fastigiate, leafy. *h.* 2ft. North America, 1739.

A. longifolius (long-leaved).* *fl.-heads* white, 1in. across, in dense corymbose panicles; involucre squarrose. October. *l.* linear-lanceolate, rarely toothed, very long, smooth. *h.* 3ft. North America, 1798. There are several varieties of this handsome species.

A. l. formosus (charming).* *fl.-heads* pink, produced in dense corymbs. *h.* 1½ft. to 2ft.

A. macrophyllus (large-leaved). *fl.-heads* white. August. *l.* large, ovate, stalked, serrated, scabrous; upper ones cordate, sessile. Stem branched, diffuse. *h.* 2ft. North America, 1739.

A. multiflorus (many-flowered).* *fl.-heads* white, small; corymb large, elongated; involucre imbricated; scales oblong, squarrose, acute. September. *l.* linear, glabrous. Stem much branched, diffuse, downy; branchlets one-sided. *h.* 3ft. North America, 1732.

A. myrtifolius (Myrtle-leaved). *fl.-heads* white; involucre imbricated; scales length of disk. August. *l.*, stem ones, amplexicaul, scabrous; those of

the branches small. *h.* 2ft. 1812.

A. novæ-angliæ (New England).* *fl.-heads* purple, in terminal clusters. September. *l.* linear-lanceolate, pilose, amplexicaul, auricled at base. Stem simple, pilose, straight. *h.* 6ft. North America, 1710. One of the best; having a tall and robust habit.

A. n.-a. rubra (red).* *fl.-heads* deep red pink, in other respects like the type. North America, 1812.

A. novæ-belgii (New York).* *fl.-heads* pale blue. September. *l.* sub-amplexicaul, lanceolate, glabrous, scabrous at edge; lower ones sub-serrated. Branches divided. *h.* 4ft. North America, 1710. There is a variety known in gardens which belongs to this species, under the name of *amethystinus*, the flowers of which are much larger and very showy.

A. obliquus (oblique). *fl.-heads* numerous; ray white; disk purplish. Autumn. *l.* alternate; lower ones linear-lanceolate, oblique; upper stem ones smaller. *h.* 5ft. North America. A very fine species, forming large tufts.

A. paniculatus (panicled).* *fl.-heads* light blue; involucre loose. September. *l.* ovate-lanceolate, sub-serrated, stalked, smooth; petioles naked. Stem much branched,

smooth. *h.* 4ft. North America, 1640.

A. pannonicus (Pannonian). *fl.-heads* violet; scales of involucre lanceolate, blunt, equal. July. *l.* linear-lanceolate, hispid at edge. Stem simple, corymbose. *h.* 2ft. Hungary, 1815.

A. patens (spreading). *fl.-heads* light purple, about 1in. across. October. *l.* oblong-lanceolate, ciliate, cordate, amplexicaul, scabrous on each side, hairy. Stem branched, hairy. *h.* 2ft. North America, 1773.

A. pendulus (drooping).* *fl.-heads* pure white at first, ultimately rosy pink, small. September. *l.* elliptic-lanceolate, serrate, smooth, those of the branches distant. Branches much spreading, pendulous. *h.* 2ft. North America, 1758. A very pretty species.

A. peregrinus (foreign).* *fl.-heads* bluish purple, 2in. across. July, August. *l.* lanceolate, sub-acute, entire, smooth, those of the stem rather narrower than the radical ones. Stem smooth, or nearly so, two or three-flowered. *h.* 1ft. North America. A very pretty little species for the rockery or border.

A. pilosus (pilose). *fl.-heads* pale blue; involucre oblong, loose, imbricated. September. *l.* linear-lanceolate, hoary. Stem branched,

villous; branchlets somewhat one-sided, one-headed. *h.* 2ft. North America, 1812.

A. præcox (early). *fl.-heads* violet; involucre imbricated; scales nearly equal; outer scales somewhat spreading. July. *l.* oblong-lanceolate, narrowed at the base. Stem hairy. *h.* 2ft. North America, 1800.

A. pulchellus (beautiful).* *fl.-heads* purple, solitary; scales of involucre nearly equal, linear, acuminate. June. *l.*, radical ones spathulate; cauline ones linear-lanceolate. *h.* 1ft. Armenia.

A. puniceus (red-stalked). *fl.-heads* blue, about 1in. across; panicle large, pyramidal; involucre loose, longer than the disk. September. *l.* amplexicaul, lanceolate, serrate, roughish. Branches panicled. *h.* 6ft. North America, 1710.

A. pyrenæus (Pyrenean).* *fl.-heads* lilac-blue (disk yellow), large, three to five in a short corymb. July. *l.* scabrous on both sides; cauline ones oblong-lanceolate, acute, sessile, sharply serrated on the upper part. *h.* 1ft. to 1½ft. Pyrenees.

A. Reevesi (Reeves's). *fl.-heads* white, with yellow centre, small; panicle dense, pyramidal. Autumn. *l.* linear, acute. Branches slender. *h.* 9in. to 12in. North America. A very

desirable species, suitable for rockwork.

A. reticulatus (netted). *fl.-heads* white. July. *l.* lanceolate-oblong, acute at each end, sessile, revolute at end, netted, and three-nerved beneath. Plant hoary all over. *h.* 3ft. North America, 1812.

A. rubricaule (red-stemmed). Synonymous with *A. spurius*.

A. salicifolius (Willow-leaved). *fl.-heads* flesh-coloured; involucre lanceolate, imbricate; scales acute, spreading at end. September. *l.* linear-lanceolate, nearly entire, smooth. Stem smooth, panicled at end. *h.* 6ft. North America, 1760.

A. salsuginosus (salt-plains).* *fl.-heads* violet-purple; involucral scales linear, loose, glandular. July. *l.* entire, the lower spathulate, obovate, tapering into a margined petiole; the upper ones lanceolate, acute, with broad base, usually sub-amplexicaul. Stem minutely pubescent, leafy nearly to the top, few-flowered. *h.* 9in. to 18in. North America, 1827. A very handsome species.

A. s. elatior (tallest). This variety grows 2ft. or more high, and has rather larger flowers than the type. North America.

A. sericeus (silky). *fl.-heads* deep

blue; terminal, about 1½in. across. Summer and autumn. *l.* oblong-lanceolate, sessile, entire, three-nerved, silky with down. *h.* 3ft. Missouri, 1802. This is a half-hardy evergreen shrub, and requires a warm, well-drained soil.

A. serotinus (late-flowering). *fl.-heads* blue. September. *l.* oblong-lanceolate, acuminate, sessile, smooth, scabrous at edge; lower ones serrated; branches corymbose, smooth. *h.* 3ft. North America.

A. Shortii (Short's). *fl.-heads* purplish blue, about 1in. across; panicles long, racemose. Autumn. *l.* lanceolate, elongated, acuminated, cordate at the base. *h.* 2ft. to 4ft. Stem slender, spreading. North America.

A. sibiricus (Siberian). *fl.-heads* blue; involucre loose; leaflets lanceolate, acuminate, hispid. August. *l.* lanceolate, sub-amplexicaul, serrate, pilose, scabrous. *h.* 2ft. Siberia, 1768.

A. sikkimensis (Sikkimese).* *fl.-heads* purple; leaflets of involucre linear, acuminate, sub-squarrose. October. *l.* lanceolate, acuminate, spinosely denticulate; radical ones on longer petioles; cauline ones sessile; corymbs large, of many heads, leafy, erect, glabrous, branched. *h.* 3ft. Sikkim, 1850.

A. spectabilis (showy).* *fl.-heads* blue; scales of involucre loose, leafy. August. *l.* lanceolate, roughish, somewhat amplexicaul; lower ones serrate in the middle. *h.* 2ft. North America, 1777. A very pretty species.

A. spurius (spurious). *fl.-heads* purple, large, few; inner scales of involucre coloured. September. *l.* linear-lanceolate, amplexicaul, polished. Stem virgate, panicled. Branches racemose. *h.* 4ft. North America, 1789. SYN. *A. rubricaule*.

A. tardiflorus (late-flowering). *fl.-heads* blue, numerous. Autumn. *l.* sessile, serrated, smooth, spathulate-lanceolate, narrowed at base, and bent down towards each side. *h.* 2ft. North America, 1775.

A. Townshendi (Townshend's). Synonymous with *A. Bigelovii*.

A. Tradescanti (Tradescant's).* *fl.-heads* white; involucre imbricated. August. *l.* lanceolate-sessile, serrated, smooth; branches virgate. Stem round, smooth. *h.* 3ft. North America, 1633. *A. multiflorus* is very much like this species, and, perhaps, a mere form thereof, with somewhat smaller flowers and more obovate-oblong leaves.

A. tripolium (Tripoli). Michaelmas Daisy. *fl.-heads* blue; disk yellow;

scales of involucre lanceolate, membranous, obtuse, imbricated. August. *l.* linear-lanceolate, fleshy, obscurely three-nerved. Stem glabrous, corymbose. *h.* 2ft. Britain.



Fig. 182. Aster turbinellus.

A. turbinellus (turbinate). *fl.-heads* delicate mauve, disposed in panicles; involucre top-shaped, scales

imbricate. Summer and autumn. *l.* lanceolate, smooth, entire, with fringed margins, somewhat stem-clasping; those of the branchlets awl-shaped. *h.* 2ft. to 3ft. North America. A very desirable species. See Fig. 182.

A. undulatus (undulated). *fl.-heads* pale blue. August. *l.* oblong-cordate, amplexicaul, entire; petioles winged. Stem panicled, hispid. Branchlets one-sided. *h.* 3ft. North America, 1699.

A. versicolor (various-coloured).* *fl.-heads* white, changing to purple; scales of involucre shorter than disk. August. *l.* sub-amplexicaul, broad-lanceolate, sub-serrate, smooth. Stem glabrous. *h.* 3ft. North America, 1790.

The annuals (*Callistemma hortensis*), usually known as French, German, or China Asters, are very extensively grown, both for beds and pots, and their diversity and generally compact growth render them almost universal favourites. They require a rich loamy soil, and as the roots are produced near the surface, a mulching of rotten dung will be found most beneficial. Seeds may be raised in a cold frame in March or April, and, when the seedlings are large enough, they must be transplanted into beds from 9in. to 12in. apart each way. If it is desired to have them in pots, they may be removed thence with a good ball of earth adhering just before they commence flowering, liberally watered, and kept lightly shaded from the sun, until root action is

resumed. Those kinds required for exhibition purposes should have several of the side shoots removed, so that the whole growing energy of the plant may be centralised into from five to seven flower-heads, by which means fine blooms may be obtained. The dwarf kinds are most valuable for bedding and pots, as the taller kinds frequently require stakes for support. The following are the most important sections:

Betteridge's Prize. Very beautifully formed and brilliantly coloured varieties, unsurpassed for exhibition purposes. As this class has rather a straggling habit of growth, it is less suitable for bedding and borders than many of the others.

Boltze's Miniature Bouquet Pyramidal. Dwarf and elegant, in compact bouquets of six or eight; the truss of flower-heads springs directly from the ground, having only a few leaves at base. Colours very varied. *h.* 6in. to 8in.



Fig. 183. Truffaut's Peony-flowered Aster.



FIG. 184. TRUFFAUT'S PERFECTION ASTER.

Crown.* Distinct. The central portion, or disk, of the head of flowers is pure white, surrounded by a broad margin of coloured ray florets, such as purple, violet, crimson, rose, &c. Flower-heads large, flat, freely produced. *h.* 1ft. to 1½ft.

Dwarf Chrysanthemum-flowered.* In size of flower-heads and habit of growth, this surpasses all other dwarf varieties. The flowers are full, Chrysanthemum-shaped, produced in clusters, or bouquets, from ten to twenty in a truss, very delicate and beautiful in colour. *h.* 1ft.

Dwarf Pyramidal or **Dwarf Bouquet**. A pretty little class, and extremely floriferous, each plant producing from twenty to fifty heads of bloom. Some of the colours are: Exquisite carmine with white points, white with blue or carmine points, white with salmon centre, &c. *h.* 1ft.

Improved Imbricate. The best strain of pyramidal Asters with recurved florets; fine regular form of flowers, double to the centre, producing but few seeds. Colours very brilliant. *h.* 2ft.

Improved Rose. A handsome class, producing a branched head, displaying no less than fifty large double flower-heads, the outer florets finely imbricated, and filled up to the centre when quite open. The colours are of great brilliancy, and of many shades. *h.* 2ft.

Pompone Goliath.* Flower-heads globular, and florets very closely set. Valuable for bouquets, as the flowers remain intact for a considerable time.

Pyramidal Hedgehog. Singular and unique. Stems upright, and branched; each branch terminated by a single flower-head, which is filled up with quill-like florets. Colours various. *h.* 1½ft.

Truffaut's Pæony Perfection.*

Vigorous upright growers, having large, hemispherical-formed heads of flowers with incurved florets, 4in. across. The colours also are very varied. *h.* about 2ft. See Figs. 183 and 184.



Fig. 185. Victoria Aster.

Victoria.* One of the most popular classes of Asters grown; flower-heads very double, imbricate, globular, 4in. in diameter, from ten to twenty on a plant, of various shades. *h.* 1ft., with a pyramidal habit. See Fig. 185.

ASTERACANTHA (from *aster*, a star, and *acantha*, a spine; referring to the disposition of the spines). ORD. *Acanthaceæ*. A handsome greenhouse herbaceous perennial, of easy culture in sandy loam. It should be grown in a sunny position, and be kept moderately dry, otherwise little but foliaceous growth will be produced; but, if thus treated, it flowers freely. Propagated by divisions in spring; or by seeds, sown in August.

> **A. longifolia** (long-leaved). *fl.* yellow, in dense axillary fascicles. July. *l.* lanceolate, tapering to the base, narrow, sessile, serrately ciliated. Stem quadrangular. Plant rather hairy. *h.* 2ft. India, 1781.

ASTERACEÆ. *See* **Compositæ**.

ASTEROCEPHALUS. *See* **Scabiosa**.

ASTILBE (from *a*, without, and *stilbe*, brilliancy; in allusion to the inconspicuous flowers of some of the species). ORD. *Saxifragaceæ*. Tall branching herbs, with triternate or biternate leaves, allied to *Spiræa*, from which they differ in having not more than three carpels, eight or ten stamens, and numerous albuminous seeds. They are all more or less graceful, and some indispensable, either when grown in isolated clumps, or intermingled with other herbaceous plants. They thrive well in almost any rich garden soil, preferring damp positions, and are easily propagated by division, which is best done in early spring. *A. japonica* is grown very extensively for decorative purposes, its elegant spikes of pure white flowers rendering it especially valuable. The majority of the plants cultivated are imported, but they may be grown fairly well in this country in heavily

manured soil. They should be potted as early as possible in the autumn, and plunged in ashes or fibre outside, when they will soon commence to root, after which they may be placed in heat, and forced as required, always giving an abundance of water. Indeed, the pots may be stood in pans of water, especially when the plants are well furnished with growth.

A. barbata (bearded). A synonym of *A. japonica*.

A. decandra (ten-stamened). *fl.* white, in spicate racemose panicles. May. *l.* biternate; leaflets cordate, deeply lobed and serrated, glandular beneath, and on the petioles. *h.* 2ft. to 3ft. North America, 1812.



Fig. 186. Astilbe japonica.

A. japonica (Japanese).* *fl.* small, pure white, in large branching racemose panicles. May. *l.* triternate or pinnate, serrated. *h.* 1ft. to 2ft. Japan. This is best grown in pots, as early frosts generally cut it down in the open air. SYNS. *Spiræa barbata* and *japonica*, also *Hoteia* and *A. barbata*. See Fig 186.

A. j. variegata (variegated).* *l.* prettily variegated with yellow; panicles much more dense than the type; indeed, it is far superior in that respect.



FIG. 187. ASTILBE RIVULARIS.

A. rivularis (brook).* *fl.* yellowish-white, or reddish, in large panicled

spikes. Late summer. *l.* biternate; leaflets ovate, doubly serrated, villous beneath and on the petioles. *h.* 3ft. Nepaul. A grand plant for the margins of lakes or damp woodlands. See Fig. 187.

A. rubra (red).* *fl.* rose, very numerous, in dense panicles. Late summer and autumn. *l.* biternate; leaflets oblique, cordate, 1in. to 2in. long, with elongated, serrated points. *h.* 4ft. to 6ft. India, 1851. A very pretty, but rare species; excellent for sub-tropical gardening.

A. Thunbergi (Thunberg's).* *fl.* small, white, very numerous, in erect, much branched, pyramidal panicles, with reddish and slightly downy stalks. May. *l.* unequally pinnate or bipinnate; leaflets broad, yellowish green, sharply toothed. *h.* 1½ft. Japan, 1878. This pretty little sub-shrub is extensively propagated on the Continent for forcing purposes.

ASTRAGALUS (a name applied to a shrub by Greek writers). Milk Vetch. ORD. *Leguminosæ*. A very large genus of hardy herbs or sub-shrubs. Flowers in axillary clusters; standard larger than the wings. Leaves unequally pinnate. About one hundred species have from time to time been introduced in English gardens; many of these are lost to cultivation; the comparative few here described are still generally grown, and are good representative

species. They are all of easy culture. The shrubby kinds grow well in any light dry soil, and are slowly increased by cuttings placed in a cold frame, or by seeds. The herbaceous perennials prefer a dry light soil, and may be increased by divisions or seeds; the latter mode is preferable, as many species are very liable to die if transplanted or divided, which is at best but a slow method. Seed should be sown in pots of sandy soil placed in a cold frame as soon as ripe, or very early in the spring, as they may lie a long time before germinating. The dwarfer species constitute admirable rockwork plants, and can be grown in pots containing a mixture of loam, peat, and sand. Seeds of the two annual species, *A. Cicer* and *A. Glaux*, merely require to be sown in the open border early in spring.

A. adsurgens (adsurgent).* *fl.* bluish purple; spikes oblong, pedunculate, longer than the leaves, densely packed. June. *l.* with eleven to twelve pairs of ovate-lanceolate acute leaflets; stipules acuminated, length of leaves. Plant ascending, smoothish. Siberia, 1818. A very handsome and rare perennial species.

A. aduncus (hooked). *fl.* rose purple, in oblong spikes; peduncles rather shorter than the leaves. June and July. *l.* with numerous pairs of roundish-ovate, smooth leaflets, sometimes downy. *h.* 6in. to 9in. Caucasus, 1819. Perennial.

A. alopecuroides (foxtail-like).* *fl.* yellow, disposed in thick dense

ovate-oblong spikes, on short axillary peduncles. June. *l.* with numerous ovate-lanceolate, pubescent leaflets; stipules ovate-lanceolate, acuminated. Plant erect. *h.* 2ft. to 5ft. Siberia, 1737. One of the finest perennial species grown.

A. alpinus (alpine). *fl.* bluish-purple, sometimes whitish, drooping, disposed in racemes of about ½in. long. Summer. *l.* impari-pinnate, with eight to twelve pairs of ovate or oblong leaflets. Britain. A very desirable, hairy, prostrate perennial.

A. arenarius (sand-loving).* *fl.* blue; peduncles few-flowered, rather shorter than the leaves. June. *l.* with linear-obtuse leaflets; stipules connate, opposite the leaves. Plant diffuse, tomentose from white adpressed down. *h.* 6in. Denmark, 1800. Perennial.

A. austriacus (Austrian).* *fl.* few; upper petal, or vexillum, blue, the rest purple; racemes pedunculate, longer than the leaves. May. *l.*, leaflets glabrous, linear, truncately emarginate. Plant diffusely procumbent. South Europe, 1640. Perennial.

A. canadensis (Canadian). *fl.* yellow, disposed in spikes; peduncles about as long as the leaves. July. *l.* with ten to twelve pairs of elliptic-oblong, bluntish leaflets. Plant

nearly erect, rather hairy. *h.* 2ft. to 3ft. North America, 1732. Perennial.

A. Cicer (Vetch-like). *fl.* pale yellow, disposed in spike-like heads; peduncles longer than the leaves. July. *l.* with ten to thirteen pairs of elliptic-oblong mucronate leaflets. Plant diffusely procumbent. Europe, 1570. Annual.

A. dahuricus (Dahurian). *fl.* purple, in dense racemes, which are longer than the leaves. July. *l.*, leaflets, seven to nine pairs, oblong, mucronate. Plant erect, pilose. *h.* 1ft. to 2ft. Dahuria to China, 1822. Perennial.

A. dasyglottis (thick-tongued).* *fl.* purple, blue, and white mixed, in capitate spikes; peduncles a little longer than the leaves. June. *l.*, leaflets elliptic-oblong, somewhat emarginate; stipules connate, opposite the leaves. *h.* 3in. to 4in. Plant diffuse. Siberia, 1818. A charming little alpine perennial.

A. falcatus (hooked). *fl.* greenish yellow, in spikes; peduncles rather longer than the leaves. June. *l.* with sixteen to twenty pairs of elliptic-oblong, acute leaflets. Plant erect, rather hairy. *h.* 1ft. to 2ft. Siberia (in wet, grassy places). Perennial. SYN. *A. virescens*.

A. galegiformis (Galega-like).* *fl.*

pale yellow, pendulous, racemose; peduncles longer than the leaves. June. *l.* with twelve to thirteen pairs of elliptic-oblong leaflets. Plant erect, glabrous. *h.* 3ft. to 5ft. Siberia, 1729. A showy perennial species.

A. Glaux (Milkwort). *fl.* purplish, in dense heads; peduncles longer than the leaves. June. *l.* with eight to thirteen pairs of small, oblong, acutish leaflets. Spain, 1596. Procumbent annual, clothed with whitish hair.

A. glycyphyllos (sweet-leaved).* *fl.* sulphur coloured, in ovate-oblong spikes; peduncles shorter than the leaves. June. *l.* with four, five, to seven pairs of oval, bluntish, smooth leaflets; stipules ovate-lanceolate, entire. *h.* 2ft. to 3ft. Britain. A perennial prostrate trailer.

A. hypoglottis (under-tongued).* *fl.* variegated with purplish, blue and white, disposed in roundish heads; peduncles longer than the leaves, ascending. June. *l.* with numerous little ovate, obtuse, dark green leaflets, somewhat emarginate; stipules connate, ovate. Stems prostrate, rather hairy. *h.* 3in. Britain, &c. Perennial trailer.

A. h. alba (white-flowered).* This resembles the type, except in the colour of the flowers.

A. leucophyllus (hoary-leaved).* *fl.* pale yellow, about ½in. long, in dense racemes; peduncles much longer than the leaves. July and August. *l.*, leaflets in numerous pairs, broadly-linear, covered with soft, silky pubescence. *h.* 2ft. to 3ft. North America. Perennial.

A. maximus (largest).* *fl.* yellow; spike sessile, cylindrical, nearly terminal. June. *l.* with ovate-lanceolate, pubescent leaflets; stipules oblong-lanceolate. *h.* 2ft. to 3ft. Armenia. A very handsome, erect, perennial species.

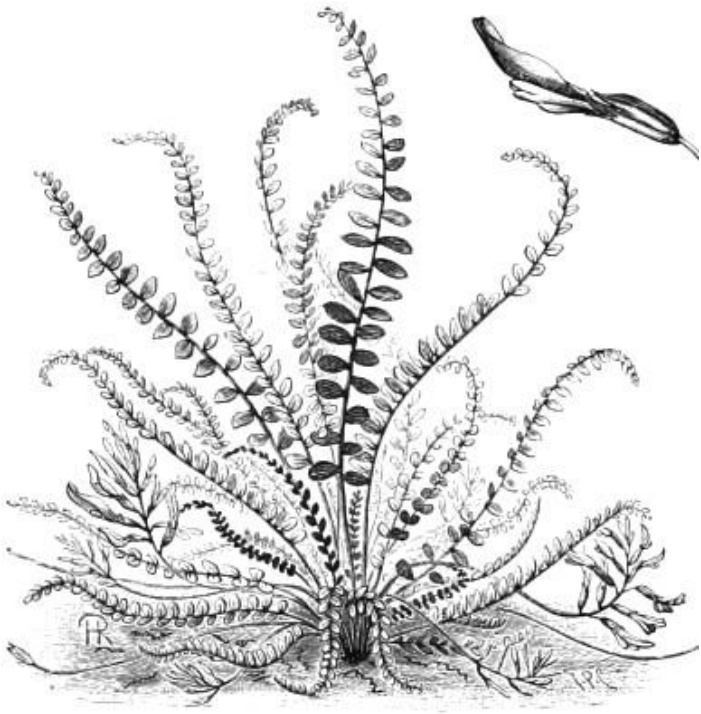


Fig. 188. Astragalus monspessulanus, showing Habit and Flower.

A. monspessulanus (Montpelier).* *fl.* usually purplish, spicate; peduncles longer than the leaves. June. *l.*, leaflets twenty-one to forty-one, ovate or lanceolate, outer ones rather the smallest. Leaves hoary, and plant almost stemless when growing in dry exposed situations; but in rich earth or moist places the leaves are almost glabrous, and the stem becomes elongated. South Europe, 1710. This species is much appreciated, and well deserves a

place in all collections. Evergreen trailer. See Fig. 188.

A. narbonensis (Narbonne). *fl.* yellow, disposed in somewhat globose spikes, on short axillary peduncles. June. *l.* with oblong-linear leaflets; stipules lanceolate. *h.* 2ft. to 3ft. Narbonne and Madrid, 1789. An erect hairy perennial.

A. odoratus (sweet-scented). *fl.* pale yellow, sweet-scented, disposed in spikes; peduncles same length as leaves. June. *l.* with eleven to fourteen pairs of oblong acute leaflets; stipules connate. Plant erect, rather ascending. *h.* 6in. Levant, 1820. Perennial.

A. onobrychioides (Onobrychis-like).* *fl.* beautiful purple, in capitate spikes on long peduncles. July. *l.* with eight to ten pairs of elliptic leaflets; stipules connate, opposite the leaves. Plant rather diffuse, shrubby at the base, clothed with adpressed hairs. *h.* 9in. to 12in. Iberia, Persia, &c., 1819. A very handsome perennial species.

A. Onobrychis (Onobrychis). *fl.* purple; spikes oblong-ovate, pedunculate, longer than the leaves. June. *l.* with seven to sixteen pairs of oblong leaflets. *h.* 1½ft., or procumbent. Mountains Southern Europe, 1640. This is an elegant perennial, and ranks among the very

best. The varieties, all white flowered, are: *alpinus*, *major*, *microphyllus* and *moldavicus*, but only the first-named is now in cultivation.

A. pannosus (woolly).* *fl.* rose-coloured, in compact globose heads, with peduncles shorter than the leaves. July. *l.* with four, five, to nine pairs of ovate-lanceolate leaflets, thickly coated with long white woolly hairs. *h.* 6in. to 9in. Siberia. Perennial.

A. ponticus (Pontic). *fl.* yellow; spikes sessile, almost globose. July. *l.* oblong, smoothish; stipules lanceolate. Stem rather hairy. *h.* 2ft. Tauria, 1820. A very showy, erect, border perennial.

A. purpureus (purple). *fl.* purplish blue, disposed in capitate spikes; peduncles longer than the leaves. June. *l.*, leaflets obovate, bidentate at the apex; stipules connate, opposite the leaves. Plant diffuse, procumbent, rather hairy. *h.* 3in. to 6in. Provence, 1820. Perennial.

A. sulcatus (furrowed).* *fl.* pale violet, but with a white keel, tipped with brown; racemes pedunculate, longer than the leaves. July. *l.* with linear-lanceolate leaflets. Plant erect, glabrous; stem furrowed. *h.* 2ft. to 3ft. Siberia, 1783. Perennial.

A. Tragacantha (great goat's

thorn).* Gum Tragacanth. *fl.* pale violet, two to five together, axillary, sessile. June. *l.* with eight to nine pairs of linear hispid leaflets; young stipules connate, clothed with silky hairs; adult ones glabrous; petioles permanent, at length becoming hardened spines. *h.* 1½ft. to 3ft. Levant, 1640. Evergreen shrub. Tragacanth, a partially soluble gum, was formerly supposed to be furnished by this plant. It is, however, now known that *A. Tragacantha* yields none. Several species from mountainous regions in Asia Minor, &c., furnish the gum.

A. vaginatus (sheathed-stipuled). *fl.* rosy-purple, with white-tipped wings; calyx rather inflated, covered with soft white and black hairs; spikes dense. Summer. *l.* impari-pinnate, with seven or eight pairs of elongated-oblong leaflets, both surfaces covered with short silvery hairs. *h.* 1ft. Siberia. Perennial.

A. vesicarius (bladdery). *fl.*, upper petal purple, the wings yellow, and the keel white, tipped with yellow; calyx clothed with black adpressed down and long white spreading hairs; peduncles longer than the leaves. July. *l.* with five to seven pairs of elliptic leaflets. Plant diffusely procumbent, hoary from adpressed silky down. *h.* 6in. to 9in.

France, 1737. Perennial trailer.

A viminens (twiggy). *fl.*, upper petal purplish rose, much longer than the pure white wings; calyx clothed with black hairs; spikes somewhat capitate, pedunculate, longer than the leaves. June. *l.* with four to six pairs of lanceolate acute leaflets, beset with adpressed hairs. *h.* 6in. to 1ft. Siberia, 1816. A handsome perennial.

A. virescens (greenish). Synonymous with *A. falcata*.

A. vulpinus (fox).* *fl.* pale yellow; spikes nearly globose, on very short peduncles. June. *l.* with obovate, obtuse, emarginate, rather velvety leaflets. Plant erect; stem glabrous. *h.* 2ft. to 3ft. Caucasus, 1815. A handsome border perennial.

ASTRANTIA (from *astron*, a star, and *anti*, in composition signifying comparison; in reference to the appearance of the umbels of flowers). ORD. *Umbelliferæ*. Ornamental, hardy, herbaceous perennials, natives of Europe and Caucasus. Universal umbels irregular, of few rays, surrounded by variable involucre; partial umbels regular, and containing many flowers, surrounded by many-leaved involucels. Radical leaves petiolate, palmately lobed; cauline ones few, sessile. Roots blackish. These are suited for borders, banks, and woodlands, growing well in any ordinary garden soil, but preferring a damp position. Easily increased by root divisions in autumn or spring.

A. carniolica (Carniolan).* *fl.* white. May. *l.* of involucre twelve to thirteen, quite entire, white, with a green line running along the middle of each, tinged with red; radical ones palmate; lobes five to seven, oblong, acuminated, unequally serrated. *h.* 6in. to 12in. Carniola, 1812. A pretty species.

A. helleborifolia (Hellebore-leaved).* *fl.* (and involucre) pink, pedicellate. June. *l.* of involucre twelve to thirteen, ovate-lanceolate, exceeding the umbel a little, bristly; radical ones palmate; lobes three, ovate-lanceolate, unequally serrated. *h.* 1ft. to 2ft. Eastern Caucasus, 1804. SYN. *A. maxima*.

A. major (greater).* *fl.* pinkish, pedicellate. May. *l.* of involucre fifteen to twenty, linear-lanceolate, quite entire, hardly longer than the umbel; radical ones palmate; lobes five, ovate-lanceolate, acute, rather trifid, toothed. *h.* 1ft to 2ft. Europe, 1596. Very distinct and ornamental.

A. maxima (greatest). Synonymous with *A. helleborifolia*.

ASTRAPÆA (from *astrape*, lightning; alluding to the brightness of the flowers). ORD. *Sterculiaceæ*. Elegant stove evergreen trees. Peduncles axillary, long, bearing on their apex an umbel of large sessile flowers, enclosed in a leafy involucre. Leaves alternate, stalked, cordate, three to five-lobed. They

thrive well in a mixture of loam and peat, and require a plentiful supply of water; but the best results accrue if the bottom of the pot can be stood in a saucer or tub of water. Propagated by cuttings of young wood, made in April, placed in a compost of loam and peat, or sand, under a bell glass, in heat.

A. tiliæflora (Lime-tree leaved). *fl.* pink. *h.* 20ft. Isle of Bourbon, 1824.

A. viscosa (clammy). *fl.* pink. *h.* 20ft. Madagascar, 1823.

A. Wallichii (Wallich's).* *fl.* scarlet; umbels drooping. July. *l.* large, cordate, angularly lobed; stipulas leafy, ovate-acuminated; peduncles long, hairy. *h.* 30ft. Madagascar, 1820. This splendid species has often been described as being one of the finest plants ever introduced into this country; and, when in full flower, nothing can exceed it in beauty and grandeur.

ASTROCARYUM (from *astron*, a star, and *karyon*, a nut; referring to the disposition of the fruit). SYN. *Phœnico-phorum*. ORD. *Palmaceæ*. Very ornamental stove palms, allied to *Cocos*, having the trunk (when present), foliage, fruit-stalks, spathes, and sometimes the fruit, covered with spines. The flowers develop from the axils of the old decayed leaves. Drupes oval, one-seeded, orange or yellow, in some species fragrant. Leaves pinnate, with linear segments, dark green above, and often of a silvery white below. The species thrive in a compost of two-thirds rich loam and one-third vegetable mould; water may be given copiously. Propagation may be effected by seeds,

which should be sown in spring in a hotbed; or by suckers, if they are to be obtained.

A. acaule (stemless). *l.* pinnate, 3ft. to 10ft. long, slender and spreading; pinnæ narrow, arranged in clusters, pendent. Spines very numerous, long, flat, black. *h.* 10ft. Brazil, 1820.

A. aculeatum (prickly). *h.* 40ft. Guiana, 1824.

A. argenteum (silvery).* *l.* arching, wedge-shaped, pinnate, distinctly plicate, bright green on the upper surface, the under surface, as well as the stalks, covered with a fine white scurf, which gives them a silvered appearance. Columbia, 1875. One of the best of silver palms.

A. filare (thready).* *l.* erect, narrowly cuneate, with two divergent lobes; petioles covered with white scurf, both on the upper and under surfaces. Distinct and elegant, with a comparatively small and slender growth. Columbia, 1875.

A. granatense (New Grenadan). *l.* pinnate, with oblong-acuminate segments; the rachis is spiny, like the petiole, both on the upper and lower surfaces; leafstalks brownish, armed with numerous scattered needle-shaped dark-coloured spines. Columbia, 1876.

A. mexicanum (Mexican). Mexico, 1864.

A. Muru-Muru (Murumuru). *l.* pinnate, 10ft. to 12ft. long; leaflets lanceolate, sub-falcate, dark green above, silvery white below. Stem 12ft. to 15ft. high, densely clothed with strong reflexed black spines, over 6in. long. *h.* 40ft. Brazil, 1825.

A. rostratum (beak-sheathed). *l.* irregularly pinnate, 3ft. to 8ft. long; pinnæ 12in. to 18in. long; terminal lobe much larger and bifid, dark green above, silvery white below; petioles broadly sheathing at the base, densely armed with black spines, sometimes 2in. long. Stem slender, densely clothed with long black spines. A slow grower, ultimately becoming 30ft. high. Brazil, 1854.

A. vulgare (common). *h.* 30ft. Brazil, 1825.

ASTROLOBIUM. *See* **Ornithopus**.

ASTROLOMA (from *astron*, a star, and *loma*, a fringe; in reference to the bearded limb of the corolla). ORD. *Epacridaceæ*. Very handsome, little, diffuse, greenhouse, evergreen shrubs. Flowers solitary, axillary; corolla tubular, distended above the middle, and with five bundles of hairs in the inside, near its base. Leaves crowded, alternate, linear, or obovate-lanceolate and mucronate. They thrive best in an equal mixture of sand, loam, and peat, with thorough drainage. Propagated by young cuttings, which root

readily in sandy soil, under a bell glass, in a cool house.

A. denticulatum (finely-toothed). *fl.* axillary, erect; corolla pale red, with a ventricose tube. May to July. *l.* scattered, lanceolate, ciliated, usually procumbent, but sometimes slightly erect. *h.* 1ft. New Holland, 1824.

A. humifusum (trailing). *fl.* scarlet, similar to the foregoing. May and June. *l.* lanceolate-linear, rather convex above, with ciliated edges. Shrub prostrate, much branched. *h.* 1ft. New Holland, 1807.

ASTROPHYTUM MYRIOSTIGMA. *See* **Echinocactus myriostigma**.

ASYSTASIA (meaning not clear). ORD. *Acanthaceæ*. Stove evergreen shrubs. Flowers disposed in axillary or terminal clusters; corolla somewhat funnel-shaped, five-lobed; calyx five-lobed, regular. Branches slender. They require a compost of peat and loam, with a little sand, and, to induce a vigorous growth, a little dry cow-dung may be applied. Propagated by cuttings of young shoots, placed in sandy soil, under a bell glass, in April, with a brisk bottom heat.

A. chelonioides (Chelonia-like).* *fl.* in terminal racemes, reddish purple, the border white. *l.* opposite, ovate-acute. *h.* 34ft. India, 1871. A pretty dwarf sub-shrub.

A. coromandeliana (Coromandel). *fl.* deep lilac; racemes axillary, elongated, secund, strict. July. *l.* opposite, cordate-ovate; branches diffuse. *h.* 4ft. India, 1845. SYN. *Justicia gangetica*.

A. macrophylla (large-leaved).* *fl.* bilabiate, bell-shaped, rosy purple outside, and almost pure white within; spikes terminal, erect, 1ft. long. June. *l.* very large, obovate-lanceolate. *h.* 8ft. to 20ft. Fernando Po, 1867.

A. scandens (climbing).* *fl.* cream-coloured; tube of corolla widened and recurved above, lobes of limb crenately curved; racemes terminal, compact, thyrse-formed. July. *l.* obovate or ovate acute, glabrous. *h.* 6ft. Sierra Leone, 1845. This handsome stove climber requires a high, moist temperature after shifting. SYN. *Henfreya scandens*.

A. violacea (violet).* *fl.* violet purple, striped with white, in terminal racemes. *l.* shortly-stalked, ovate-acuminate, deep green, minutely hairy on both surfaces. *h.* 1ft. to 2ft. India, 1870. A pretty dwarf plant.

ATACCIA CRISTATA. *See* **Tacca integrifolia**.

ATALANTIA (mythological: Atalanta, the daughter of Schœneus). ORD. *Rutaceæ*. A genus of ornamental stove evergreen shrubs, having the eight stamens

united below into a tube, and with undivided leaves. It comprises about ten species. They thrive well in a mixture of loam and peat. Propagated by means of ripened cuttings, which will root readily if planted in sand under a hand glass, in heat.

A. monophylla (one-leaved). *fl.* small, white, in axillary racemes. *fr.* golden yellow, about the size of a nutmeg. June. *l.* simple, ovate-oblong, emarginate at the apex. Spines small, simple. *h.* 8ft. India, 1777. A thorny shrub.

ATAMASCO LILY. *See* **Zephyranthes Atamasco**.

ATHAMANTA (named from Mount Athamas, in Sicily, where some species are found). ORD. *Umbelliferæ*. A genus of greenhouse or hardy herbaceous plants, usually velvety from villi on the stem, leaves, and fruit. Flowers white; involucra of one or few leaves; involucel of many leaves. The undermentioned is the only species in cultivation, and is a very graceful perennial, with Fennel-like foliage. It thrives well in any ordinary soil. Increased by divisions, or by seeds sown in spring.

A. Matthioli (Matthioli's). *fl.* white, twelve to twenty-five to an umbel. Summer. *l.* three or four ternate; leaflets linear-filiform, elongated, divaricate. *h.* 1ft. to 2ft. Alps of Carinthia, 1802.

ATHANASIA (from *a*, not, and *thanatos*, death; alluding to the length of time which the flowers last). ORD. *Compositæ*. Rather ornamental greenhouse

evergreen shrubs with yellow flowers, from the Cape of Good Hope. They grow well in a soil consisting of three parts loam and one part peat. Propagation is effected by cuttings, taken from half-ripened wood in spring, and placed in sand, under a hand glass.

A. capitata (headed).* *fl.-heads* yellow. March. *l.* pinnati-partite; younger hoary, older smooth. *h.* 1½ft. Cape of Good Hope, 1774.

A. pubescens (downy). *fl.-heads* yellow. July. *l.* oblong, entire (or tridentate), softly hairy on both sides; when old, sub-glabrous. *h.* 6ft. Cape of Good Hope, 1768.

ATHEROSPERMA (from *ather*, an awn, and *sperma*, seed; seeds awned). ORD. *Monimiaceæ*. A beautiful greenhouse evergreen tree, with the aspect of a stately conifer. Flowers panicled, diœcious; perianth five to eight-fid. Leaves opposite, aromatic. A compost of loam and peat, in about equal proportions, is necessary. It can be readily propagated by cuttings.

A. moschata (Musk-scented). Plume Nutmeg. *fl.* white. June. *h.* 40ft. New Holland, 1824.

ATHEROSPERMEÆ. *See* **Monimiaceæ**.

ATHRIXIA (from *a*, not, and *thrix*, a hair; the receptacle being destitute of hairs). ORD. *Compositæ*. A greenhouse evergreen shrub. It succeeds best in turfy loam, peat, and sand, and requires to be potted firmly. Propagated by cuttings of young wood, placed under a bell glass in sandy soil, and treated

like *Ericas* (which *see*).

A. capensis (Cape).* *fl.-heads* bright crimson, solitary, terminal. April. *l.* narrow, lanceolate, alternate, entire. *h.* 3ft. Cape of Good Hope, 1821.

ATHROTAXIS (from *athros*, crowded together, and *taxis*, arrangement; in reference to the disposition of the scales of the cones). ORD. *Coniferæ*. A small genus of Tasmanian evergreen diœcious trees or shrubs, with small scale-like leaves, and small globular cones of many imbricated scales, with from three to six carpels under each scale. In very sheltered situations they will probably prove hardy; but, otherwise, they are only suitable for botanical collections. Increased by cuttings. This genus is almost universally misspelt *Arthrotaxis*.

A. cupressoides (Cypress-like). *l.* small, thick, leathery, spirally arranged, closely imbricated, deep glossy green. *h.* 30ft. A small, erect, and very slow growing tree, with numerous slender branchlets.

A. Doniana (Don's). A synonym of *A. laxifolia*.

A. imbricata (imbricated). A garden synonym of *A. selaginoides*.

A. laxifolia (loose-leaved). Differing from *A. cupressoides* in having longer, more pointed, open, and spreading leaves, which stand out from the stem in a Juniper-like fashion. Its lateral growths are rather

pendulous. *h.* 20ft. to 25ft. SYN. *A. Doniana*.

A. selaginoides (Selago-like). *l.* glossy green, scale-like, spirally disposed, closely appressed to the shoots, branches and their ramifications very numerous. *h.* variable, up to 40ft. Very interesting, and quite distinct. SYN. *A. imbricata* (of gardens).

ATHYRIUM. *See* **Asplenium**.

ATRAGENE (a name originally given to *Clematis Vitalba* by Theophrastus). ORD. *Ranunculaceæ*. A genus of ornamental, hardy, climbing, deciduous shrubs, closely allied to *Clematis*, from which they differ in having numerous petals. They are increased by cuttings, which should be pricked in light sandy soil and placed under a hand glass; also by layering in the autumn. Both methods are slow; the layers should not be separated for about a year, when they will be vigorous plants. Seeds must be sown in early spring, in gentle heat; when the seedlings are large enough to handle, they should be pricked off and grown on in pots till they are strong plants.



Fig. 189. Atragene alpina, showing Habit, Twining Leafstalk, and Flower.

A. alpina (alpine).* *fl.* blue, varying to white; petals ten to twelve, linear at the base, but dilated at the apex; peduncles one-flowered, longer than the leaves. May. *l.* biternate; leaflets ovate-lanceolate, acuminated, serrate. Mountainous parts of Europe, 1792. The white-flowered variety, named *alba*, is in cultivation. Syns. *A. austriaca* and *A. sibirica*. See Fig. 189.

A. americana (American).* *fl.* large, purplish-blue; petals acute; peduncles one-flowered. May. *l.* whorled, in fours, leaflets stalked, cordate, lanceolate, acuminated, entire or somewhat lobed, or serrated. North America, 1797. Syn.

Clematis verticillaris.

A. austriaca (Austrian). Synonymous with *A. alpina*.

A. macropetala (large-petaled).* *fl.* blue. Manchuria, 1870.

A. sibirica (Siberian). Synonymous with *A. alpina*.

ATRIPLEX (from *a*, not, and *traphein*, to nourish). Orach. ORD. *Chenopodiaceæ*. A genus of, for the most part, uninteresting weeds, of very variable form and habit, and having the calyx, which encloses the fruit, enlarging after flowering. For culture, *see* **Orach**.

A. hortensis (garden). An annual species from Tartary, of no value as an ornamental plant, but considered a very desirable substitute for spinach. The leaves must be gathered for use when young. The variety *A. h. atro-sanguinea* is a very pretty form, having handsome crimson leaves, and growing to a height of about 4ft. It is well worth growing with such plants as *Amaranthus*, &c.

ATROPA (name of mythological origin). Belladonna; Dwale. ORD. *Solanaceæ*. A small genus, having a campanulate regular corolla, and a leafy persistent calyx. The berries of this native herbaceous perennial are exceedingly poisonous. The plant is of no horticultural value.

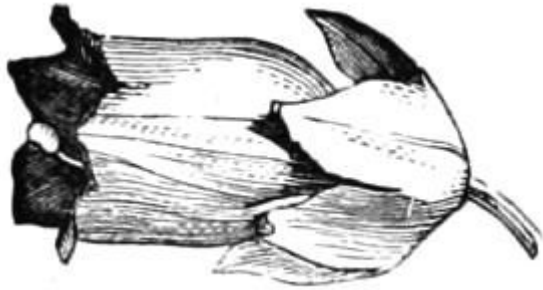


FIG. 190. FLOWER OF ATROPA BELLADONNA.

A. Belladonna. *fl.* green and purple, solitary, pedunculate, drooping. Summer. Berries about the size of a small cherry. *l.* ovate, acuminate, 4in. to 8in. long *h.* 2ft. to 4ft. Britain. See Fig. 190.

ATTALEA (from *attalus*, magnificent; referring to the beauty of the genus). ORD. *Palmaceæ*. A genus of handsome stove palm trees, distinguished from other genera in having the pinnæ arranged vertically, and not horizontally. The leaves spring up almost perpendicularly at the base, but in the upper part arch over. The pinnæ stand at right angles to the rachis—which is very narrow in proportion to its thickness—and while those of the lower side of the arch hang straight down, those of the upper side point straight up. They thrive well in a mixture of peat and loam in equal quantities, and enjoy a copious supply of water. Summer temperature, 65deg. to 80deg.; winter, 55deg. to 60deg. All the species are robust trees; but, although several have been introduced, few appear to be generally grown.

A. amygdalina (Almond-fruited).* *l.* pinnate, 3ft. to 6ft. long; pinnæ 12in.

to 18in. long, and about 1in. broad; terminal lobe broad and bifid, rich dark green. Stem slender. New Grenada. One of the best. SYN. *A. nucifera*.

A. Cohune (Cohune).* *l.* erect, ultimately spreading, pinnate, furnished with from three to four dozen dark green pinnæ, sometimes 18in. in length; petioles rounded, and dark brown below, flat and green upon the upper side. Plant unarmed. *h.* 50ft. or more in its native habitat. Honduras.

A. compta (decked). *h.* 22ft. Brazil, 1820.

A. excelsa (tall).* *h.* 70ft. Brazil, 1826.

A. funifera (rope-bearing). The Piassaba Palm. *l.* vivid deep green, very ornamental, and of economic value in Brazil. 1824. The sheathing bases of the leafstalks separate into a coarse black fringe, which is collected and exported to Europe, being used in the manufacture of brooms, brushes, &c.

A. nucifera (nut-bearing). A synonym of *A. amygdalina*.

A. speciosa (showy).* *h.* 70ft. Brazil, 1825.

A. spectabilis (remarkable). *h.* 70ft. Brazil, 1824.

ATTENUATED. Tapering gradually to a point.



Fig. 191. Fruiting Branch of Round Aubergine.



Fig. 192. Fruiting Branch of Long Aubergine.

AUBERGINE, or **EGG PLANT** (*Solanum melongena*, variety *ovigerum*). These plants, besides being useful for culinary purposes, are very ornamental, and present an attractive appearance on walls or trellises, or in the flower garden; and, as they do well in any ordinary rich garden soil, if the position is warm, they give a good variation to the general run of plants used for decorative effects. The Black-fruited kind is particularly suited for this purpose. Sow the seeds in a gentle heat, in the middle of April. As soon as the seedlings are large enough to handle, prick off into 4in. pots, replacing in heat till they root out freely. Gradually harden off by June, and then transfer to the positions where they are to grow. Let

the plants be at least 2ft. apart, and place a strong stick to each one to support the fruit when it comes. For trellises, select the more moderate-sized varieties. In hot, dry weather, the application of liberal supplies of liquid manure tends to increase the size of the fruit, and also to make the foliage more vigorous and handsome. Where very large fruit are needed for show or other purposes, it is well to remove all but the best one on the plant, and, by careful feeding with liquid manure, specimens of from 10lb. to 12lb. weight can be had. The foliage should not be pinched, as this would prevent the free swelling of the fruit. Aubergines are not so much grown in England for culinary purposes as in France and Italy, where they are largely used in stews and soups. The following are the most desirable varieties: New York Purple, the largest kind grown, and although not as ornamental as the next, is quite as useful; Black-fruited, large black fruit, with blackish violet leaves; and White-fruited, the sort most generally cultivated. See Figs. 191 and 192.

AUBRIETIA (named after M. Aubriet, a famous French botanical draughtsman). ORD. *Cruciferæ*. A small genus of hardy evergreen trailers. Racemes opposite the leaves, and terminal, lax, few-flowered. Leaves ovate or oblong, entire or angularly toothed, hairy. They make excellent rock plants, and will thrive in a deep rich loam anywhere, excepting under the shelter of trees. Cuttings struck, or seeds sown, during April or May generally make fine, dense, cushion-like growths, if transplanted on to a somewhat cool or shaded border, and carefully lifted in the autumn; the cuttings are best "drawn," or grown until they are soft, in a frame before they are removed. Where a stock of old plants exist, layer the

long slender branches any time after flowering, and cover with a mixture of sand and leaf soil; they will then root freely and establish themselves in time for spring blooming, for which purpose, when grown *en masse*, they are most useful. After flowering, they may be divided and transplanted.



Fig. 193. Aubrietia deltoidea.

A. deltoidea (deltoid).* *fl.* purple; petals twice the length of the calyx; pedicels short, filiform; racemes opposite the leaves and terminal, lax, few-flowered. Early spring. *l.* with one or two large teeth on each side (therefore they are rhomboidal, not truly deltoid), scabrous, with short branchy stellate hairs. *h.* 2in. to 4in. Naples, &c., 1710. There are several garden varieties, the best of

which are described below; most of them are regarded as distinct species. See Fig. 193. (S. F. G. 628.)



Fig. 194. Aubrietia purpurea.

A. d. Bouganvillei (Bouganville's).* *fl.* light violet purple, with very even imbricated petals. Habit very dwarf and compact, with short peduncles. A pretty form.

A. d. Campbelli (Campbell's).* Larger deep violet blue flowers, and of far more vigorous constitution than the typical form. *Grandiflora* comes very near this. Syn. *A. Hendersonii*.

A. d. Eyrei (Eyre's).* A very fine variety, with a free branching habit,

and large flowers of a rich violet-purple colour, rather longer than broad. *A. olympica* is very near, if not identical with this.

A. d. græca (Grecian).* *fl.* light purple. *h.* 4in. Greece, 1872. One of the best and largest flowered forms; very vigorous grower, with neat compact habit. A variety of this, named *superba*, has rather deeper-coloured flowers, produced over a very extended period. (R. G. 697.)

A. d. purpurea (purple).* Larger flowers and more erect habit than the type. *l.* broader, with two to five teeth. Stems more leafy. There is a variegated form, which is very pleasing and effective, useful for carpeting or edging small beds. See Fig. 194.

A. d. violacea (violet).* This is a hybrid form, even finer than *Campbelli*, with large deep violet-purple flowers, fading to reddish-violet, and is more effective than any of the others.

A. Hendersonii (Henderson's). A synonym of *A. d. Campbelli*.

AUCUBA (the Japanese name of the shrub). ORD. *Cornaceæ*. A genus of hardy evergreen shrubs, thriving better than any other in the smoky atmosphere of dense cities. They grow in ordinary well-drained garden soil, and require no special culture. If grown in pots, they should be planted

firmly in rather sandy yellow loam, with plenty of drainage. They should not be allowed too large pots, or an unfruitful growth is likely to result. During the growing season, an abundance of water is needed, which must be lessened when the plants are fully developed. If cultivated in the greenhouse or conservatory, they should be plunged out of doors during summer. To insure a good supply of the very ornamental berries, which are produced on the female plant, careful fertilising is necessary. The time for applying the pollen is when the pistil exudes a slightly gummy substance, and otherwise shows signs of maturity. When it happens, as is sometimes the case, that the male blooms are open and the pollen mature before the female blooms are ready, the pollen should be collected on a dry camel-hair pencil, transferred to a piece of glass, and covered over by another piece, both of which must also be dry. It may be applied afterwards when wanted, as it retains its power for some weeks. Propagated by cuttings, inserted in any light sandy soil, with or without a covering, in spring or autumn; or readily increased from seeds, sown as soon as ripe.

A. himalaica (Himalayan).* *l.* lanceolate, or lanceolate acuminate; branches of the panicle very pilose. Berries spherical, not oblong. Himalaya. (F. d. S. 12, 1271.)

A. japonica (Japanese).* *l.* opposite, petiolate, broad, ovate-lanceolate, acuminated, toothed, leathery, glabrous, shining, pale green, beautifully spotted with yellow, having the midrib rather prominent, the rest of the leaf reticulately

veined. *h.* 6ft. to 10ft. Japan, 1783. The numerous varieties, both of the male and female forms, among which will be found many of great beauty, all differ, more or less, in the variegation of their leaves. They are in very general cultivation, and nearly every nurseryman has an assortment. Among the best of them are the following: *albo-variegata*, *aurea*, *bicolor*, *latimaculata*, *limbata*, *longifolia*, *macrophylla*, *ovata*, *pygmæa*, and *pygmæa sulphurea*.

AUDOUINIA (in honour of V. Audouin, a profound entomologist). ORD. *Bruniaceæ*. An ornamental greenhouse evergreen shrub, thriving in a mixture of peat and sandy loam. Propagated by cuttings of half-ripened wood, inserted in sand, under a bell glass, in gentle heat.

A. capitata (headed). *fl.* purple, crowded into oblong, spike-like, terminal heads. May. *l.* spirally inserted, a little keeled. Branches erect. *h.* 1ft. to 2ft. Cape of Good Hope, 1790.

AULACOSPERMUM. A synonym of **Pleurospermum** (which *see*).

AULAX (from *aulax*, a furrow; the under surface of the leaves of the original species being furrowed). ORD. *Proteaceæ*. Greenhouse evergreen shrubs, from the Cape of Good Hope, thriving best in a compost of fibrous loam, leaf soil, and sharp sand, with thorough drainage. Ripened cuttings, taken off at a

joint, and inserted in pots of sandy soil, will root readily under a hand glass, in a cool house.

A. pinifolia (Pine-leaved). *fl.* yellow, racemose. July. *l.* filiform, channelled. *h.* 2ft. 1780.

A. umbellata (umbelled). *fl.* yellow. June. *l.* flat, spathulate*-linear. *h.* 2ft. 1774. (B. R. 12, 1015.)

AURANTIACEÆ. An order of trees or shrubs, including the Orange and Lemon trees. Flowers fragrant. Fruit fleshy, edible. Leaves alternate, articulated above the stem, filled with transparent oil cysts, giving them a dotted appearance. Well-known genera are *Citrus* and *Limonia*.

AURICULA (*Primula Auricula*). This favourite spring flower (see Fig. 195) was, at one time, almost universally cultivated, but has of late years fallen into much neglect; it is now, however, happily regaining enthusiastic admirers. Although its culture is not nearly so difficult as is generally understood, a few special items of treatment are nevertheless necessary to grow it successfully.



Fig. 195. A Variety of Primula Auricula.

Frames for the reception of Auriculas should be prepared, with a good bottom drainage, and an inside staging, similar to the back stage of a lean-to greenhouse, arranged as near the glass as possible. If the frames are about 4ft. wide, they will be very convenient; 1ft. deep in the front, and about 3ft. at the back. This will allow for a good stage arrangement. Of course, it is not necessary to construct an expensive staging, as common boards can be laid upon pots of various heights, the same results being practically secured. These frames should face north from May to October, and south in winter, during which latter time it will be necessary to well cover the sides with straw or brake. When frosty, the lights must also be mated; but, unless there is absolute fear of frost, the glass should not be

covered, as the more light the plants receive the better. On all suitable occasions, both during summer and winter, air must be freely admitted, and a good look-out kept during showery weather; hence it may be necessary to tilt the lights with blocks rather than remove them entirely. The latter plan should be adopted whenever practicable, especially during early spring, and after they are well established in their fresh pots in summer. This will greatly assist to ripen the crown, and produce hard, stout foliage, which will endure the winter much better than if grown with less air. Many cultivators prefer small span or lean-to houses to frames; and it must be admitted that these are better, more convenient, and in every way more beneficial. Simple, inexpensive structures, no higher than is absolutely necessary for convenience, with top and side ventilation, will meet all requirements; and if a 2in. hot-water pipe is arranged next the eaves inside, it will be a decided advantage during very severe weather.

Soil. The best compost that can be prepared for Auriculas is as follows: Four parts good fibrous loam, one part well-rotted cow manure, one part good leaf soil, and one part coarse river or silver sand, with a little charcoal or pounded oyster-shells added. Carefully mix the whole together before using. The loam should be stored about twelve months previous to being used, and it should be selected from districts with a fine atmosphere; the turf should be cut about 3in. thick. Cow manure that has lain for a year or so, and been subjected to sharp frosts, is most suitable, as insect life, which it very probably contains, is thereby destroyed, and the whole materially sweetened.

Potting. This operation requires to be carefully done

as soon after flowering as possible, unless it is desired to save seed, when it must be deferred until the seed is ripened. May and June are the best months for general potting, and whatever the size of the pots used, they should be carefully and thoroughly drained. After a good layer of potsherds, place some charcoal, leaf mould, or spent hops. Many good growers use the last very advantageously. For good flowering plants, 48-sized pots are used, many cultivators preferring glazed pots to the unglazed; but such are not absolutely necessary to ensure success. Before repotting, remove most of the old soil, and with a sharp knife cut off any bruised or cankered portion of roots; the stout tap-root may also be cut away if devoid of fresh rootlets. Do not pot very firmly. Remove the plants to their summer quarters, withholding water for a few days, and keep the frames close. About a week after potting, water may be advantageously given, the plants will then soon resume root-action, and air may be admitted afterwards on all suitable occasions. The collar or neck of the plant must be left well above the surface of the soil.

Watering is a point that requires careful attention, as neglect in this matter will result in failure. During the growing season, Auriculas require an abundance of water; in fact, they must never be allowed to get dry. In the winter, they must only be watered when they are really dry, especially during a severe season. Care must be taken to avoid watering the leaves, particularly in early spring, as this tends to spoil the effect of the charming farinose foliage. Above all, water must not be allowed to stand in the heart of the plant, as such will inevitably cause incipient decay. Hence it is necessary to keep a sharp lookout for drippings from the glass, and to maintain tightly-

glazed frames. On all occasions, decaying leaves must be removed, and especially during winter.

Top-dressing. About the middle or end of February, when the plants commence new growth, the surface soil should be removed about an inch or so deep, and the pots re-filled with a rich compost made up of the following: Two parts of turfy loam, one of rotten cow or hen manure, and one of leaf soil; if a little Standen's Manure is added, the compost will be improved. After this top-dressing, the plants may be watered freely.

Propagation by Offsets. When top-dressing, any offsets with roots should be removed, and as soon after as possible the remaining ones should be taken off, as it is much more desirable to do so early than later on, when repotting; for, when making the first growth, they are the more likely to root better, and stand a greater chance of making good plants before the season is over. Fill well-drained 3in. pots with sandy soil, and arrange about four offsets round the sides; place under a bell glass, or in a close handlight, watering very sparingly so as to prevent them damping off. They will soon establish themselves, after which air may be admitted, and the plants may ultimately be potted off singly. To induce choice varieties to make offsets, the top of the old plant should be removed and treated like the others, when, as a rule, several shoots will be produced, which in due time may be removed. By this means, a nice stock of the rarer kinds may be obtained; whereas, if such a course were not adopted, the rate of increase would be extremely slow.

Flowering. During the flowering period, watering, as already stated, must be carefully attended to, for if the plants are allowed to get dry, the flowers will

quickly shrivel. They must also be kept well shaded from sunshine, which quickly destroys the delicate blossoms. As the trusses are developing, particular attention must be given to night protection. It is, perhaps, better to cover every night than to run the risk of exposing the unexpanded flowers to frost, as the effect is very prejudicial; in fact, if subject to frost, smooth even flowers may not be expected.

Seed Saving and Sowing. The only way to obtain new varieties is by seed; hence the value of careful seed-saving will be apparent. Severe discrimination must be exercised in the selection of parents, and the flowers must be very carefully crossed. The anthers should be removed from the pistillate parent, if possible, before expansion, so as to prevent any possibility of self-fertilisation; and, when the stigma is ready, the pollen must be conveyed by means of a small camel's-hair brush, care being taken not to mistake the brushes used in different classes. It has been observed in Auriculas that the issue from crossbred seed favours the pollen more than the pistillate parent; hence the necessity of selecting good pollen parents. It is best to confine hybridisation to separate classes—*i.e.*, cross a Self with a Self, and a Green-edged variety with another of the same class. The importance of selecting the best in each class scarcely needs suggestion, having regard to constitution as well as the quality of the flowers. The seed should be sown as soon as ripe, or early in March, in well-drained pots, filled with sandy soil, which must be well watered previous to sowing. When this operation is completed, the seed must be lightly covered with coarse sand, a sheet of glass placed over the pot, and the latter stood in the hand glass, where the offsets are rooted. Some of the seedlings will appear in a month, but the bulk from

that sown when ripe will not be seen until the following spring; while others will germinate even during the ensuing summer. The late comers should be particularly cared for, as they frequently produce the best varieties. When the seedlings are large enough, they must be pricked off in pots of sandy soil; and, when well established, potted off singly into small thumb pots, and afterwards encouraged as judgment suggests. Some growers allow the seedlings to remain in the store pots till they flower, when the best are kept, and those not required disposed of.

Insect Pests. Green fly are often very troublesome, and should be exterminated as speedily as possible, by tobacco fumigation, or by dipping the plants in a solution of Gishurst's Compound, or carefully prepared Fir-tree Oil, all of which are effectual. Many authorities denounce fumigation, while others advocate it. The roots are also attacked by a mealy louse, named *Trama auriculæ*, which clusters about the roots and collar of the plants, sucking nutriment therefrom; and although, provided they do not attack the collar, they have no greatly prejudicial effect on the plant, yet it is desirable to exterminate them. The only effectual way of accomplishing this is to remove all soil, and thoroughly cleanse the roots and collar in a solution of soft soap, with a little Fir-tree Oil added. Of course, this is most easily managed when repotting; and, unless the plants are very badly infested, it would not be advisable to run the risk of root washing later in the year.

Classes. Auriculas are now arranged in five classes, four of which constitute what are known as "show or stage Auriculas," while the other is known by the name of "Alpines." Each class is characterised by special points of distinction, which, in the opinion of

the strict "florists" school, it is of the utmost importance to observe; and as there is room for systematists in this, as well as in any other branch of floriculture, we will follow the arrangement usually adopted, and describe the distinguishing features of, and enumerate some of the best varieties in, each class, with their raisers' names attached:

Green-edged. Outer edge green, or but sparingly dusted with powder; next, a zone of colour known as the body colour, which varies, the darkest being most esteemed; both edges of this zone should be even, especially the inner one, but there are few flowers perfect in this respect. Next to the body-colour is the paste, which occupies the space between the inner circle of the latter and the throat, this should be pure and dense, with a distinctly circular outline at the throat; the throat and tube should be bright yellow. Of course, this ideal standard has not yet been reached, as there are supposed defects in all or some sections of the flowers at present known. *Leading Varieties*: ADMIRAL NAPIER (Campbell), ALDERMAN WISBEY (Headley), APOLLO (Beeston), CHAMPION (Page), COLONEL TAYLOR (Leigh), DUKE OF WELLINGTON (Dickson), FREEDOM (Booth), GENERAL NEILL (Traill), HIGHLAND BOY (Pollitt), IMPERATOR (Litton), LADY ANN WILBRAHAM (Oliver), LORD PALMERSTON

(Campbell), LOVELY ANN (Oliver), LYCURGUS (Smith), PRINCE OF GREENS (Traill), PRINCE OF WALES (Ashton).

Grey-edged. Edge heavily dusted with powder, so as almost to hide the normal green colour; other points same as the Green-edged varieties. *Leading varieties*: ALEXANDER MEIKLEJOHN (Kay), CHAS. E. BROWN (Headley), COMPLETE (Sykes), CONQUEROR OF EUROPE (Waterhouse), DR. HORNER (Read), F. D. HORNER (Simonite), GENERAL BOLIVAR (Smith), GEORGE LEVICK (Walker), GEORGE LIGHTBODY (Headley), JOHN WATERSTON (Cunningham), LANCASHIRE HERO (Lancashire), RICHARD HEADLEY (Lightbody), ROBERT TRAILL (Lightbody).

White-edged. Edge so heavily dusted with farina as to completely hide the green and give it a white appearance; the powder frequently as dense as on the paste portion; other points like the first. *Leading varieties*: ACME (Read), ANNE SMITH (Smith), ARABELLA (Headley), BEAUTY (Traill), BRIGHT VENUS (Lee), CATHERINA (Summerscales), CONSERVATIVE (Douglas), COUNTESS OF WILTON (Cheetham), EARL GROSVENOR (Lee), FAVORITE (Taylor), FRANK SIMONITE (Simonite), GLORY (Taylor), JOHN SIMONITE (Walker), NE PLUS ULTRA (Smith), REGULAR (Ashworth),

SMILING BEAUTY (Heap), SYLVIA (Douglas), TRUE BRITON (Hepworth).

Selfs. Tube bright yellow, and circular at the top; paste dense, pure, with an even edge; all the rest of the flower of one colour, without shades or edging; any colour holds good. *Leading varieties*: APOLLO (Hay), BLACKBIRD (Spalding), C. J. PERRY (Turner), DUKE OF ARGYLE (Campbell), FORMOSA (Smith), GARIBALDI (Pohlman), HELEN LANCASTER (Pohlman), LORD OF LORNE (Campbell), MAZINNA (Pohlman), METEOR FLAG (Lightbody), METROPOLITAN (Spalding), MRS. DOUGLAS (Simonite), MRS. STURROCK (Martin), OTHELLO (Netherwood), PIZARRO (Campbell), TOPSY (Kaye).

Alpines. Centre golden yellow, or white, and destitute of powder; body colour various; edge one-coloured, shading off paler towards the margin. These are much hardier than any of the other classes, and will do well outside in most places. *Leading varieties*: A. F. BARRON (Turner), BEATRICE (Turner), BLACK PRINCE (Turner), BRONZE QUEEN (Turner), COLONEL SCOTT (Turner), DIADEM (Gorton), DUCHESS OF CONNAUGHT (Turner), EVENING STAR (Turner), GEORGE LIGHTBODY (Turner), JOHN LEECH (Turner), MRS. BALL (Turner), MRS. DODWELL (Turner), MRS.

LLEWELLYN (Turner), MRS. MEIKLEJOHN (Meiklejohn), MRS. THOMSON (Turner), QUEEN VICTORIA (Turner), RUBENS (Turner), SAILOR PRINCE (Turner), SELINA (Turner), SPANGLE (Turner), SYDNEY (Turner), TRIUMPHANT (Turner).

AURICULATE. Having ear-like appendages.

AUSTRIAN ROSE. *See* **Rosa lutea**.

AVENA (derivation obscure). The Oat. ORD. *Gramineæ*. A genus of grasses with loose panicles and compressed spikelets. Of agricultural importance only, with the following exception, which is an annual of easy culture in ordinary garden soil. Propagated by seeds, sown in spring or autumn.

A. sterilis (barren). The Animated Oat. *fl.* in drooping panicles of large spikelets. *h.* 1½ft. to 2ft. Barbary, 1640. An elegant plant.

AVENS. *See* **Geum**.

AVENUES. In forming an Avenue, the plan must neither be tortuous nor of a "tedious sameness," but a gradually winding line should, above all, be obtained, which must in no way interfere with the view from the house. About 12ft. is the width usually allowed for the road, but this depends upon individual taste or idea—this remark applies to planting in double rows, the trees forming a series of triangles, or in single rows. The distance across the road from one row of trees to those opposite should be at least 24ft. The Lime is extensively used for Avenues on account of its regular growth and the

shade it affords. The Cedar of Lebanon is one of the best and most suitable evergreens. The Dutch Elm is used because of its rapid growth, and forms one of the best deciduous trees for this purpose. The well-known Horse Chestnut, in sheltered spots, is very ornamental, as is also the Spanish Chestnut; the latter spreads rapidly. Where immediate effect is required, nothing gives more satisfaction than the White Poplar; it grows in a wet soil better than anything else. Deodars, Araucarias, Douglas Pine, the Mexican, Chinese, and Japanese Cypresses, and many others, are eminently suited for Avenue planting. Shrubs and herbaceous plants should be introduced between the trees, and so remove any bareness that may occur. *Diervilla rosea*, and its variegated form, *Aucubas*, *Rhododendrons*, *Hypericums*, and many others, could be mentioned to serve this purpose. A moderately good soil will be found to answer generally.

AVERRHOA (in honour of Averrhoes, of Cordova, a celebrated Arabian physician, who resided in Spain during the domination of the Moors, about the middle of the twelfth century; he translated Aristotle into Arabic). ORD. *Geraniaceæ*. Ornamental stove trees, thriving in loam and peat. Half-ripened cuttings will strike in sand, under a hand glass, about April, with bottom heat. The leaves of the first-named species are irritable to the touch.



Fig. 196 Azalea balsaminæflora.

A. Bilimbi (Bilimbi-tree). *fl.* reddish purple, disposed in racemes, rising from the trunk. May. *fr.* oblong, somewhat resembling a small cucumber, with a thin, smooth, green rind, filled with a grateful acid juice, and the substance and seeds not unlike that of a cucumber. *l.* alternate, with from five to ten pairs of ovate-lanceolate, entire, smooth leaflets on short stalks. *h.* 8ft. to 15ft. Native country unknown, 1791. (B. F. S. 117.)

A. Carambola. Carambola-tree. *fl.* red, scattered, disposed in short racemes, usually rising from the smaller branches, but sometimes from the larger ones, and even the trunk. *fr.* the size of a hen's egg,

acutely five-cornered, with a thin, yellow rind, and a clear watery pulp. *l.* alternate, with about four to five pairs of ovate, acuminated, entire, stalked leaflets, the outer ones largest. *h.* 14ft. to 20ft. 1793. This, as well as the first-named species, is cultivated throughout the hotter parts of India, but where it occurs truly wild is not known.

AVOCADO PEAR. *See* **Persea gratissima**.

AWL-SHAPED. Narrow-pointed, resembling an awl.

AWLWORT. *See* **Subularia**.

AXIL. Literally the armpit; in plants applied to the angle formed by union of the leaf and stem.

AXILLARIA. *See* **Polygonatum**.

AXILLARY. Growing in the axil of anything.

AYRSHIRE ROSE. *See* **Rosa repens capreolata**.

AZALEA (from *azaleos*, dry, arid; in allusion to the habitat of the plant). ORD. *Ericaceæ*. A genus of very popular and beautiful hardy or greenhouse plants. The species enumerated were included under *Rhododendron* by Don, Loudon, and others, contrary to the classification of Linnæus, but the distinctive characters are not consistent. In this genus, the stamens are usually five, but in *Rhododendron* ten is the typical number.

Ghent or *American Azaleas*. These are extremely popular hardy deciduous shrubs. When plants are grown in the open, artificial crossing will be unnecessary; but this method must be employed upon those grown in the cool greenhouse, if well

fertilised seeds are required. The seed should be gathered and sown when ripe in a large shallow frame containing from 2in. to 3in. of peat, over which more peat must be laid very level by means of a fine sieve; or they may be kept until early the following spring. No covering will be necessary, but a thorough watering with a fine-rosed water-pot must be given. The lights should be darkened, and the frames kept close until the young seedlings begin to appear, when they must have air (carefully admitted), shade, and a daily sprinkling of water. By the autumn, they will be large enough to transplant in small clumps into boxes of peat and coarse sand, and to place in other frames, or in the open. In each case, they will need watering, shading, and to be kept close until growth commences. The hardier the plants are before winter commences, the better; but a protection of mats or similar material will prevent the probability of their being killed by severe frosts. During the following season, they will only require water during dry weather, and no protection need be afforded this winter. The next spring, they should be planted out singly in beds, sufficiently wide apart to allow the development of two years growth. If an upright growth is being made, the leading shoot must be shortened, in order to secure dwarf, well-branched plants. The same methods should be employed on a smaller scale where but a few are wanted. Grafting is largely practised to increase the stock of named varieties or choice seedlings, the stock employed being *A. pontica*. This process, of course, ensures the quicker production of flowering plants. Layering in March, encasing the part buried with moss, is also some times practised; but the layer must be left two years before separating. Cuttings of the last year's wood, 2in. or 3in. long, taken with a

heel, root readily in sand; about the end of August is the best time for so doing. If they are pricked off in pots or pans of sandy soil, and kept in a cool frame until they are calloused, and afterwards introduced into a slight bottom heat, they root quicker, but this is not absolutely essential. When placed outside, they should be covered with a handlight for about two months, and, at the end of this time, air should be gradually given and increased. Ghent Azaleas are now forced extensively for the market as well as in private gardens; and, by judicious culture, they can be had in full blossom by Christmas. With this end in view, they should be grown in pots, and have the growth prematurely completed soon after flowering with the aid of a little artificial heat; after which they may be placed outside. During very hot and dry weather, the north side of a wall is necessary, to prevent their flowering in the autumn. The same plants must only be forced every alternate year. Commence to place the plants in heat in October, and keep up a succession until the following March. The best plants for forcing purposes are obtained from the Continent, where they are grown in enormous quantities. When grown permanently out of doors, the most suitable soil is peat and rough sand mixed. Failing this, leaf mould, maiden loam, and sand, will be found satisfactory. In many cases, we have known them to flourish in ordinary garden soil.

The following varieties of Ghent Azaleas are distinct, and all worth growing; ADMIRAL DE RUYTER, deep red-scarlet, very fine; ALTACLERENSIS, bright yellow; AMŒNA, light pink; CARNEA ELEGANS, pale pink, shaded

sulphur; COCCINEA MAJOR, dark scarlet, very fine; CUPREA SPLENDENS, rich pink, shaded yellow; DECORATA, lovely pink; DIRECTEUR CHARLES BAUMANN, rich vermilion, spotted yellow; ELECTOR, rich orange-scarlet; GEANT DES BATAILLES, deep crimson, very fine; MADAME JOSEPH BAUMANN, bright pink, very free and good; MARIA VERSCHAFFELT, shaded pink and yellow; MIRABILIS, very lovely pink; MORTERI, rich yellow, shaded rosy-red; PONTICA MACRANTHA, rich deep sulphur, very large and fine; PRINCESSE D'ORANGE, salmon-pink, very fine; SANGUINEA, deep crimson; VISCOSA FLORIBUNDA, pure white, very fragrant.

A. arborescens (tree-like).* *fl.* large, reddish, not clammy, leafy; tube of corolla longer than the segments; calyx leafy, with the segments oblong and acute. May. *l.*, of the flower buds large, yellowish-brown, surrounded with a fringed white border, obovate, rather obtuse, smooth on both surfaces, glaucous beneath, ciliated on the margins, and having the midrib almost smooth. *h.* 10ft. to 20ft. Pennsylvania, 1818. Deciduous species.

A. balsaminæflora (Balsam-flowered).* *fl.* bright salmony red, finely double and rosette-like, the

segments regularly imbricated, much resembling in general appearance the blooms of a Camellia-flowered Balsam. Japan. It is a distinct species, and remains in bloom for a considerable period; the flowers are invaluable for bouquets. See Fig. 196, for which we are indebted to Mr. Bull.

A. calendulacea (Marigold-like).* *fl.* yellow, red, orange, and copper coloured, large, not clammy, rather naked; tube of corolla hairy, shorter than the segments. May. *l.* oblong, pubescent on both surfaces, at length hairy. *h.* 2ft. to 6ft. Pennsylvania to Carolina, 1806. This is said to be the handsomest shrub in North America. There are several varieties of it in cultivation. Hardy; deciduous. (B. M. 1721, 2143.)

A. hispida (bristly). *fl.* white, with a red border and a tinge of red on the tube, which is wide and scarcely longer than the segments, very clammy, leafy; stamens ten. July. *l.* long-lanceolate, hispid above, and smooth beneath, glaucous on both surfaces, ciliated on the margins, and having the nerve bristly beneath. Branches straight, and very hispid. *h.* 10ft. to 15ft. New York, &c., 1734. A hardy deciduous species. (W. D. B. 1, 6.)



Fig. 197. Flower of Azalea ledifolia.

A. ledifolia (Ledum-leaved).* *fl.* pure white, showy; corolla campanulate; in threes at the extremities of the branches; calyx erect, glandular, and viscid. March. *l.* elliptic-lanceolate. *h.* 2ft. to 6ft. China, 1819. The whole shrub is very hairy. Hardy; evergreen. Syn. *A. liliiflora*. See Fig. 197. (B. M. 2901.)

A. liliiflora (lily-flowered). Synonymous with *A. ledifolia*.

A. nudiflora (naked-flowered).* *fl.* in terminal clustered racemes, appearing before the leaves, rather naked, not clammy; tube of corolla longer than the segments; teeth of

calyx short, rather rounded; stamens much exserted. June. *l.* lanceolate-oblong, nearly smooth and green on both surfaces, ciliated on the margins, having the midrib bristly beneath, and woolly above. *h.* 3ft. to 4ft. North America, 1734. This species hybridises very freely with *A. calendulacea*, *A. pontica*, *A. viscosa*, &c., and descriptive lists of a host of hybrids of almost every conceivable shade, both double and single, are to be found in continental and home catalogues, to which the reader is referred. Hardy. (W. F. A., t. 36.)

A. pontica (Pontic).* *fl.* leafy, clammy; corolla funnel-shaped; stamens very long. May. *l.* shining, ovate, oblong, pilose, ciliated. *h.* 4ft. to 6ft. Levant, Caucasus, &c., 1793. The varieties of this species are also numerous, differing principally in the colour of the flowers and the hue of the leaves. The flowers are of all shades, and frequently striped. The name generally adopted, as above, must not be confounded with *Rhododendron ponticum*. If the genus *Azalea* is merged into Rhododendron, as is done by most systematists, this plant must be called by Don's name, *Rhododendron flavum*. (I. H. 1864, 415.)

A. procumbens (procumbent). *See* **Loiseleria procumbens**.

A. speciosa (showy).* *fl.* scarlet and orange coloured; corolla silky, with obtuse, ciliated, lanceolate, undulated segments; calyx pubescent. May. *l.* lanceolate, ciliated, acute at both ends. Branches hairy. *h.* 3ft. to 4ft. North America. The varieties of above are several, varying in the shape of the leaves and the colour of the flowers. (L. B. C. 1255)

A. viscosa (clammy).* *fl.* white, sweet-scented, in terminal clusters, downy, clammy, leafy; tube of corolla as long as the segments. July. *l.* oblong-ovate, acute, smooth, and green on both surfaces, ciliated on the margins, having the midrib bristly. *h.* 2ft. to 4ft. North America, 1734. Like nearly all species belonging to this genus, the varieties are many, varying in the colour of the flowers and otherwise. (T. S. M. 438.)

A. v. nitida (shining).* *fl.* white, tinged with red, clammy, leafy; tube of corolla a little longer than the segments. April. *l.* oblanceolate, rather mucronate, leathery, smooth on both surfaces, shining above, having the nerve bristly beneath, with revolute, ciliated margins. *h.* 2ft. to 4ft. New York, 1812. Hardy; deciduous. (B. R. 5, 414.)

Indian or Chinese Azaleas. This is a section of

greenhouse evergreen varieties obtained from *A. indica* (which *see*), blooming continuously from November to June, or even later, and of the greatest value for all purposes, whether for decoration, cutting, or exhibition. Cultivation: Thorough drainage is essential, and a compost of half peat, the other half made up of fibrous loam, leaf soil, and sand, in equal quantities. They cannot have too much light and air, and may be grown to almost any size by shifting from one pot to a size larger. In repotting, the whole of the crocks should be taken away from the base of the ball of soil and roots, and the top should also be removed till the fine roots are reached. The plant should then be put in the new pot, and the additional soil rammed firm, in order to prevent the water running through it, and thus depriving the plant of any benefit therefrom. In all cases, the roots near the stem must be above the soil, so that the water may not sink in next the stem, or death will most certainly ensue. After potting, for a few days the plants should be kept close and freely syringed, and as the growth is completed, they may be well hardened off. The best time for potting is after flowering, before the new growth has been made. From October to June the plants should be in the greenhouse, and during the other months in a cold frame, or plunged in pots in the open; or, what is preferable in favoured localities, planted out in prepared beds; they will thus be kept cleaner, and the growth will be much superior. In autumn they may be lifted and repotted, placing in a shady position for a few days. Water in abundance must be given throughout the blooming and growing season; and the plants must, on no account, be allowed to become dry. At the same time, a proper amount of care is most essential, as an excessive amount of

moisture is equally as fatal as drought. Cuttings should be placed in sand under a bell glass with moderate bottom heat; half-ripened ones are preferable. They must be cut up to a joint—the base of a leaf—the lower leaves for an inch stripped off, and the stem stuck into the sand, which should lay, about an inch thick, on the top of sandy peat soil; the bottom of the cuttings should reach, but not go quite into, the soil. The whole should be covered with a bell glass, which must be wiped dry every morning. Soon after the cuttings have commenced growing, place them in small pots. They are also very largely and easily increased by grafting; indeed, this is the only satisfactory method of securing standards. Seeds may be sown similar to the last section, but in the greenhouse, and, when well up, pricked out into little pots 1in. apart. Azaleas are liable to the attacks of thrips and red spider, the latter being especially troublesome if the plants are in a dry position; frequent syringing will materially help to eradicate both pests. If insufficient, syringe with a solution of Gishurst's Compound.

A. amœna (pleasing). *fl.* almost campanulate, rich crimson, about 1½in. across, hose-in-hose conformation, produced in great profusion. April. *l.* small, size of the common Box, hairy. *h.* 1ft. China. This is an elegant little neat and compact growing shrub, which has proved to be quite hardy in England. (B. M. 4728.) A very beautiful series of hybrids have been obtained by crossing this species with *A. indica*, which are most serviceable and free.

The following are most desirable: LADY MUSGRAVE, light carmine; MISS BUIST, pure white; MRS. CARMICHAEL, rich magenta, shaded crimson; PRIME MINISTER, soft pink, deep shaded, very free; PRINCESS BEATRICE, light mauve, very distinct and free; PRINCESS MAUDE, rich magenta, rose shaded.



FIG. 198. FLOWER OF AZALEA INDICA.

A. indica (Indian).* *fl.* campanulate, terminal, solitary or twin; calycine teeth long-lanceolate, obtuse, ciliated, spreading. *l.* cuneate-lanceolate, finely crenelated, covered with sharp, close-pressed rigid hairs, attenuated at both ends.

Branches also covered with sharp, close-pressed, rigid hairs. *h.* 3ft. to 6ft. China, 1808. See Fig. 198. There are a great number of garden seedlings of the Indian Azalea, including every shade and colour. A selection to any extent may be made from the nurserymen's catalogues, but, for the guidance of the amateur, we have made a rigid selection of the best double and single varieties.

Double-Flowered: A. BORSIG, pure white; ALICE, rich deep rose, blotched with vermilion, very fine; BERNARD ANDRÉ, dark violet-purple, large, semi-double; CHARLES LEIRENS, dark salmon, good form and substance; COMTESSE EUGENIE DE KERCHOVE, white, flaked with red-carmine, semi-double; DOMINIQUE VERVAENE, bright orange, very fine; DR. MOORE, deep rose, with white and violet shading, very fine; EMPEREUR DE BRÉSIL, rich rose, banded white, the upper petals marked red; FRANCIS DEVOS, deep crimson; IMBRICATA, pure white, sometimes flaked with rose; MADAME IRIS LEFEBVRE, dark orange, shaded with bright violet, and blotched with chocolate; PRESIDENT GHELLINCK DE WALLE, intense rose, upper petals blotched with lake, and crimson-rayed; SOUVENIR DE PRINCE ALBERT, rich rose peach, broadly margined with pure white, very free and

beautiful.

Single-Flowered: CHARMER, rich amaranth, very large; COMTESSE DE BEAUFORT, rich rose, the upper petals blotched with crimson; CRITERION, rich salmon pink, white-margined; DUC DE NASSAU, rich rosy-purple, very free and large; ECLATANTE, deep crimson, rose shaded; FANNY IVERY, deep salmon-scarlet, blotched magenta, very fine; FLAMBEAU, rich glowing crimson, extremely showy; JOHN GOULD VEITCH, lilac-rose, netted and bordered white, and blotched with saffron, very showy; LA SUPERBE, rich lake, bordered orange, and black spotted, a very fine variety; LA VICTOIRE, centre reddish, white towards the edge, the upper petals spotted with maroon-crimson; LOUIS VON BADEN, pure white, a grand variety; MADAME CHARLES VAN ECKHAUTE, pure white, with beautifully crisped edges, of excellent form and substance; MADAME VAN HOUTTE, richly flaked with carmine and rose, very large and free; MARQUIS OF LORNE, brilliant scarlet, of the finest form and substance; MRS. TURNER, bright pink, white-margined, and spotted with crimson; PRESIDENT VAN DEN HECKE, white, striped and speckled with crimson, with a yellow centre; PRINCESS ALICE, pure white, one of the best; REINE DES PAYS-BAS, rich violet-

pink, margined with white; ROI D'HOLLANDE, dark blood-red, spotted with black; SIGISMUND RUCKER, rich rose, white bordered, with crimson blotches; WILSON SAUNDERS, pure white, striped and blotched with vivid red, very fine.

A. mollis (soft). Synonymous with *A. sinensis*.

A. sinensis (Chinese). *fl.* campanulate, downy, flame coloured; stamens equal in length to the petals. May. *l.* slowly deciduous, elliptic, acutish, pilosely pubescent, feather-nerved, with ciliated margins, greyish beneath. *h.* 3ft. to 4ft. China and Japan. A large number of seedlings and hybrids from this species are in cultivation, known under the name of Japanese Azaleas, and all are valuable for the decoration of the cool conservatory, or for outdoor work. SYN. *A. mollis*. (L. B. C. 885.)

AZARA (in honour of J. N. Azara, a Spanish promoter of science, but of botany in particular). ORD. *Bixineæ*. Showy evergreen, hardy and half-hardy shrubs, with alternate, simple, stalked stipulate leaves, and fragrant flowers. They thrive well in a compost of loam, leaf soil, and sand. Ripened cuttings root readily if placed in sand, under glass, in slight heat. It is believed that all the species enumerated will prove hardy if a slight winter protection in midland and northern counties be afforded. This precaution will be unnecessary in

more southern parts.

A. dentata (toothed). *fl.* yellow; corymbs sessile, few-flowered. June. *l.* ovate, serrated, scabrous, tomentose beneath; stipules leafy, unequal in size. *h.* 12ft. Chili, 1830. (B. R. 1728.)

A. Gillesii (Gilles').* *fl.* bright yellow; panicles axillary, densely packed. Spring. *l.* large, Holly-like, ovate, coarsely toothed, smooth. *h.* 15ft. Chili, 1859. (B. M. 5178.)

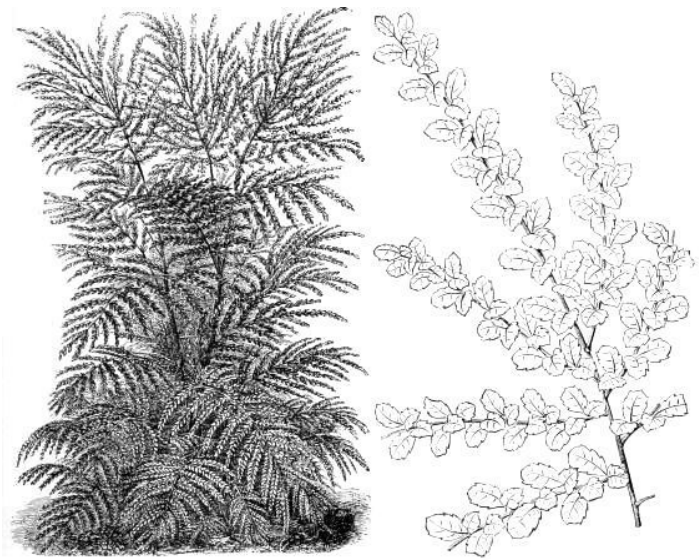


Fig. 199. Azara microphylla, showing Habit, and Foliage (half natural size).

A. integrifolia (entire-leaved).* *fl.* yellow, on numerous short axillary spikes, of an aromatic fragrance. Autumn. *l.* obovate or oblong, entire,

smooth; stipules equal, permanent. *h.* 18ft. Chili (about Conception), 1832. The variegated-leaved form, although rare, is very ornamental. The variegation consists of greenish-yellow, with a blotch of dark green, and in a young state edged with deep pink.

A. microphylla (small-leaved).* *fl.* greenish, corymbose, succeeded by numerous small orange-coloured berries. Autumn. *l.* small, distichous, obovate, obtuse, dark-shining green. *h.* 12ft. Chiloe and Valdavia, 1873. This shrub is very ornamental as a standard, and also excellent for covering walls. Quite hardy. See Fig. 199, for which we are indebted to Messrs. Veitch and Sons.

BABIANA (from *babianer*, the Dutch for baboon; in reference to the bulbs being eaten by baboons). ORD. *Iridaceæ*. A genus of very ornamental bulbous plants confined to the Cape of Good Hope, with the exception of a single species, which is found in Socotra. Flowers occasionally fragrant, and generally characterised by their rich self-colours, or the striking contrast of very distinct hues in the same flower; perianth regular and symmetrical, with six ovate divisions (tube varying in length). Stems from 6in. to 9in. high, arising from a small bulb-like corm, and bearing tapering plaited leaves, which are usually more or less densely covered with long hairs; the scapes are racemose, each bearing about six or more simultaneously expanding flowers. They may

be successfully grown in pots. By this plan there is, perhaps, less danger of loss, and their flowering season can be prolonged considerably. A light sandy compost, with a small proportion of well-decayed manure, is required, and thorough drainage is also most essential. Use 48 or 60-sized pots, placing four or five corms in the former, and two or three in the latter, and keep moderately dry until they commence to form roots. October is the best time to pot. As soon as the plants appear above ground, water may be carefully given, and the supply proportionately increased as the plants develop. Very weak liquid manure, applied twice a week, just as the spikes are pushing up, will be beneficial. When the flowers fade, and the stems show signs of decay, the supply of water must be gradually decreased, thus inducing the thorough maturation of the corms, upon which the next season's display depends. When quite down, store the pots in a dry place till the time for repotting arrives, when the corms should be carefully cleaned, and all offsets separated, the latter being potted up in the same way as the parent corms in order to produce flowering specimens; or they may be kept in a pot of sand and planted in a warm border outside in March. Outdoor culture: A sheltered, sunny, and well-drained situation is most essential to success. Although not absolutely necessary, it is preferable to replant every year in early spring, placing the bulbs about 5in. or 6in. deep, with a little sand sprinkled about them. Planting may, of course, be done in autumn, when it will be necessary to cover with cocoa nut fibre refuse to the depth of 5in. or 6in. In warm, sheltered situations, the corms may remain undisturbed; but, as a rule, it is desirable to remove them late in autumn, when the leaves are dead, and store them in dry sand through the winter in a cool,

airy position, free of frost. Mixed Babianas may be purchased from dealers at a cheap rate, and, for general purposes, they are best to plant. Propagation may be effected by offsets and seeds. The former is the best and quickest method. The offsets should be grown in boxes or planted out in light rich soil until large enough for flowering. Seeds sown in pans, and placed in a gentle heat, will grow at almost any time; the young plants will require to be carefully transplanted each season until they develop into blooming corms.



Fig. 200. Babiana stricta rubro-cyanea.

B. cœrulescens (bluish). Synonymous with *B. plicata*.

B. disticha (two-ranked).* *fl.* with a Hyacinth-like fragrance; perianth pale blue; divisions narrow; margins undulated or crisped. June, July. *l.* lanceolate, acute. *h.* 6in. 1774. (B. M. 626.)

B. plicata (folded).* *fl.* with a very fragrant clove carnation-like perfume; perianth pale violet-blue; anthers blue, and stigmas yellow. May, June. *l.* lanceolate, distinctly plicate. *h.* 6in. 1774. SYNS. *B. cœrulescens*, *B. reflexa*. (B. M. 576.)

B. reflexa (reflexed). Synonymous with *B. plicata*.

B. ringens (gaping).* *fl.* scarlet, irregular in form, gaping, very handsome. May, June. *l.* narrow, acute, deep green. *h.* 6in. to 9in. 1752. (L. B. C. 1006.)

B. sambucina (Elder-scented). *fl.* bluish-purple, with an Elder-like fragrance; perianth divisions spreading. April, May. *l.* lanceolate, slightly plicate. *h.* 6in. to 9in. 1799. SYN. *Gladiolus sambucinus*. (B. M. 1019.)

B. stricta (strict).* *fl.*, perianth segments narrow, acute, outer three white, inner three lilac-blue, with a dark blotch near the base of each. May. *l.* broadly lanceolate, obtuse, ciliated. *h.* 1ft. 1795. (B. M. 621.)

B. s. angustifolia (narrow-leaved). *fl.* fragrant; perianth bright blue, slightly pink in the tube. May and June. *l.* linear, acute, light green. *h.* 1ft. 1757. (B. M. 637.)

B. s. rubro-cyanea (red-and-blue).* *fl.* 2in. or more in diameter; upper

half of the perianth very brilliant blue, and the lower part rich crimson, forming a central zone, in striking contrast to the blue portion. May, June. *l.* broad, acuminated, downy on the under surface. *h.* 6in. to 8in. 1796. See Fig. 200. (B. M. 410.)

B. a. sulphurea (sulphur-coloured).* *fl.* cream-coloured or pale yellow; anthers blue, and stigmas yellow; segments spreading. April, May. *l.* narrow-obtuse. *h.* 9in. 1795. SYNS. *Gladiolus sulphureus*, *G. plicatus*. (B. M. 1053.)

B. s. villosa (villous).* *fl.*, perianth smaller than the last, with the narrower segments rather more widely spreading than in *B. s. rubro-cyanea*, brilliant crimson, with violet-blue anthers. August. *h.* 6in. 1778. (B. M. 583.)

BABINGTONIA (named after C. C. Babington, Professor of Botany at Cambridge, and a distinguished botanical author). ORD. *Myrtaceæ*. A very pretty greenhouse evergreen shrub, allied to *Bæckea*, from which it differs in having the stamens collected in groups opposite the sepals. Cuttings of the young unflowering shoots may be planted in sand under a bell glass, and kept in a moderate heat until rooted, when they should be placed singly in small pots, in a compost of equal parts loam and peat, with the addition of a little sand. As the small pots fill with roots, the plants should be removed into larger ones, and the compost have less sand in

it; but this should not be done until the next February. The established plants must have a good shift about March or April, and should be kept in a light, airy greenhouse; the first shoots may be topped to moderate their vigour, and to produce a greater profusion of less luxuriant ones. In May, when most plants are removed from the greenhouse, these should be set to grow under a frame which, while shielding them from heavy rains, and supporting some slight shading in the hottest parts of the sunny days, will not prevent a free circulation of air. To this end, the frame should be elevated from the rests or supports at its corners; the lights should be left off at night in fine, mild weather, and on dull, cloudy days, being only replaced during heavy rains, and when shading is necessary. Towards autumn, the plants must be returned to the greenhouse.

B. Camphorasmæ (camphor-smelling).* *fl.* pinkish-white, in little cymes, disposed in long terminal racemes. Summer. *l.* linear, opposite, nerved. *h.* 7ft. Australia, 1841. (B. R. 28, 10.)

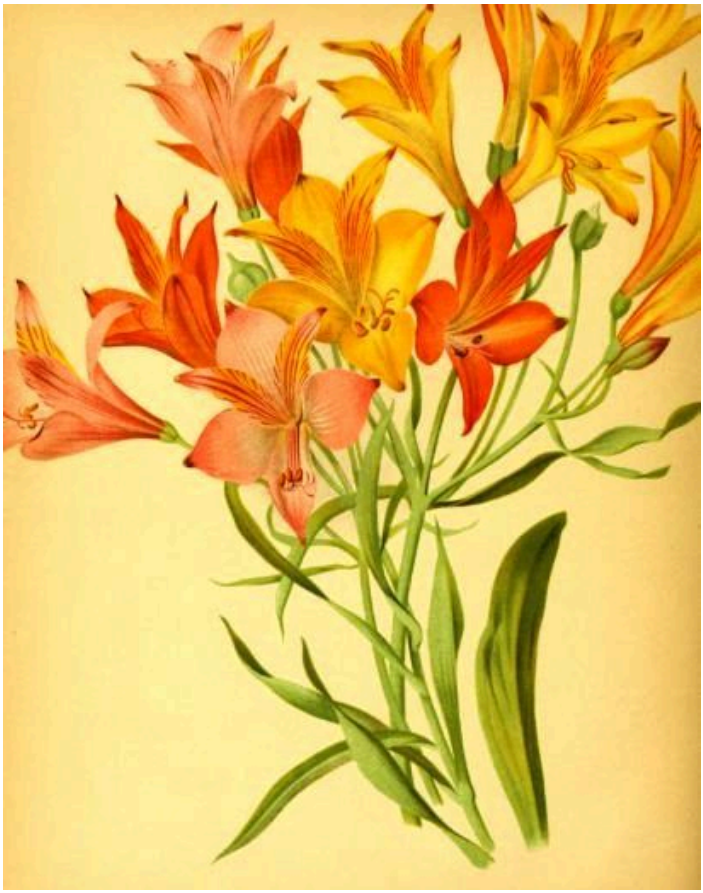
BACCATE. Berried, fleshy; having a pulpy texture.

BACCHARIS (from Bacchus, wine; referring to the spicy odour of the roots). Ploughman's Spikenard. ORD. *Compositæ*. A genus of hardy, stove, or greenhouse herbs, shrubs, or trees. Flower-heads many-flowered, diœcious, terminal. Involucre sub-hemispherical or oblong, in many series, imbricated. Leaves simple, alternate, exstipulate, deciduous, oblong-lanceolate, notched, serrated, or entire. Shrubs of short duration. These plants are neither beautiful nor ornamental, but are of easy cultivation

in ordinary soil. Propagated by cuttings.

B. halimifolia (Halimus-leaved). Groundsel Tree. *fl.-heads* white. July. *l.* oblong-cuneate, obovate, coarsely toothed; branches angular. *h.* 6ft. to 12ft. Northern United States, 1683. Hardy.

BACHELORS' BUTTONS. The double-flowered forms of *Ranunculus acris*, *Lychnis diurna*, &c.



HYBRID ALSTRŒMERIAS

[See larger version]

BACKHOUSIA (commemorative of the late James Backhouse, a botanical traveller in Australia and South Africa). ORD. *Myrtaceæ*. A greenhouse evergreen shrub, requiring a compost of fibry peat, loam, and a little white sand. Propagated, in April, by half-ripened cuttings, inserted in sand, under a bell glass, in a cool house.

B. myrtifolia (Myrtle-leaved).* *fl.* white, disposed in corymbs, and often produced on cuttings soon after having struck root. May. *l.* ovate, acuminate, smooth. Branches slender. *h.* 16ft. New South Wales, 1844. (B. M. 4133.)

BACONIA. A synonym of **Pavetta** (which *see*).

BACTRIS (from *baktron*, a cane; the young stems being used for walking sticks). ORD. *Palmaceæ*. Very ornamental, slender growing, and prickly stove palms. Peduncle of the spadix bursting through about the middle of the leaf sheath. Drupes small, ovate, or nearly round, and generally of a dark blue colour. Leaves pinnatisect; segments generally linear and entire. Instead of being confined to the apex of the trunk, the leaves are scattered over nearly the whole surface, and the lower ones retain their verdure long after the upper ones have fully developed. Stems slender, varying from 2ft. to 10ft. in height. Some of the species are of easy culture in a compost of loam, peat, loaf mould, and sand, in equal parts; but most of them are very difficult to manage. Propagation may be effected by suckers, which are very freely

produced. Many species are ornamental only when in a young state.

B. baculifera (cane-bearing). *l.* pinnate, bifid at the apex, 2ft. to 6ft. long; pinnæ arranged in clusters about 1ft. long and 2in. broad, dark green above, paler below; petioles sheathing and densely clothed with sharp brown and black spines, 1½in long. South America.

B. caryotæfolia (Caryota-leaved).* *fl.*, spathe ovate, prickly; branches of spadix simple, flexuous. *l.*, pinnæ wedge-shaped, three-lobed, and erose; rachis, petioles, and caudex, prickly. *h.* 30ft. Brazil, 1825.

B. flavispina (yellow-spined). Synonymous with *B. pallidispina*.

B. major (greater). *fl.* greenish-yellow, with a broadly ovate spathe. *h.* 25ft. Carthagena, 1800.

B. Maraja (Maraja). Maraja Palm. *fl.* yellow, with a prickly spathe. *h.* 30ft. to 50ft. Bahia, 1868.

B. pallidispina (pale-spined).* *l.* pinnate, bifid at the apex; pinnæ clustered, 6in. to 12in. long, 1in. wide, dark; petioles sheathing at the base and furnished with a profusion of long, yellow spines, which are tipped with black. Brazil. SYN. *B. flavispina*.

BACULARIA (from *baculum*, a walking-stick). ORD. *Palmaceæ*. A small genus containing a couple of stove species, which are amongst the smallest palms of the Old World. Both are confined to the east coast of tropical Australia. *B. monostachya*—in allusion to its slender stem, which rarely exceeds in thickness that of the thumb—is known as the Walking-stick Palm.

B. minor (lesser). *l.* attaining 3½ft. Stems, several from same rhizome, 2ft. to 5ft. high, ½in. thick. Queensland.

B. monostachya (one-spiked). *l.* pinnate, pendent, 6in. to 12in. long, bifid at the apex; pinnæ about 4in. across, broad, irregular in shape, with ragged and irregular ends; dark green. Stem slender, petioles sheathing. *h.* 10ft. New South Wales, 1824. SYN. *Areca monostachya*. (B. M. 6644.)

BADGER'S BANE. *See* **Aconitum meloctonum**.

BÆA (commemorative of Rev. Dr. Beau, of Toulon, brother-in-law to Commerson, the discoverer of the genus). SYN. *Dorcoceras*. ORD. *Gesneraceæ*. Curious and pretty greenhouse herbaceous perennials, requiring a rich sandy loam. They are easily propagated by seeds. Probably the only species in cultivation is the following:

B. hygrometrica (hygrometric).* *fl.* pale blue-coloured, yellowish at the throat; segments of the limb more or less reflexed; corolla five-lobed, somewhat resembling that of the

Violet; scapes numerous, naked, few-flowered. Summer. *l.* in a rosette, thinly covered with coarse white hairs, ovate acute at both ends, crenate serrate. *h.* 6in. North China, 1868. (B. M. 6468.)

BÆCKEA (named after Abraham Bæck, a Swedish physician, and an esteemed friend of Linnæus). ORD. *Myrtaceæ*. Very pretty greenhouse evergreen shrubs. Flowers white, pedicellate, small. Leaves opposite, glabrous, dotted. They thrive in a compost of sandy peat, leaf soil, and lumpy, fibrous loam. Cuttings, taken from young wood, root readily, if pricked in a pot of sand, with a bell glass placed over them, in a cool house.

B. diosmæfolia (Diosma-leaved).* *fl.* axillary, solitary, approximate, sessile. August to October. *l.* oblong, rather cuneated, keeled, acute, crowded, imbricate, and are, as well as the calyces, ciliated. *h.* 1ft. to 2ft. New Holland, 1824.

B. frutescens (shrubby).* *fl.* solitary; pedicels axillary. November. *l.* linear, awnless. *h.* 2ft. to 3ft. China, 1806. (B. M. 2802.)

B. parvula (little). *fl.*, peduncles axillary, umbelliferous. *l.* elliptic-oblong, obtuse, rather mucronate. *h.* 1ft. New Caledonia, 1877. This is very close to *B. virgata.* (R. G. 886, 2.)

B. virgata (twiggy).* *fl.*, peduncles

axillary, umbelliferous. August to October. *l.* linear-lanceolate. *h.* 2ft. to 3ft. New Caledonia, 1806. (B. M. 2127.)

BÆRIA (named in honour of Professor Baer, of the University of Dorpat). ORD. *Compositæ*. A genus consisting of about half a dozen species. Probably the only one in cultivation is that mentioned below; it is a very pretty plant, of easy culture in ordinary garden soil. Propagated by seeds, sown in spring.

B. chrysostoma (golden-mouthed). *fl.-heads* bright yellow, solitary, terminal, about 1in. across; involucre of about ten leaflets, in two series. Early summer. *l.* linear, opposite, entire. Stems erect, downy. *h.* 1ft. California, 1835. (S. B. F. G. ii. 395.)

BAGGED. Swelled like a sac or bag.

BAHIA (probably from Port of Bahia, or San Salvador, in South America). SYN. *Phialis*. ORD. *Compositæ*. An ornamental, hardy, herbaceous perennial, much branched from the base of the stem, and having a greyish appearance. It may be increased by seeds, or by divisions.

B. lanata (woolly). *fl.-heads* yellow, solitary, produced in great numbers. Summer. *l.* alternate, or with the lower ones sometimes opposite, deeply divided, and sometimes ligulate and entire. *h.* 6in. to 15in. North America. This species thrives

on borders of light and well-drained sandy soil. (B. R. 1167.)

BALANIUS. *See* **Nut Weevil**.

BALANTIUM (of Kaulfuss). *See* **Dicksonia**.

BALANTIUM (of Desvaux). *See* **Parinarium**.

BALBISIA (commemorative of Giovanni Battista Balbis, a Professor of Botany at Turin). SYN. *Ledocarpum*. ORD. *Geraniaceæ*. A very ornamental half-hardy evergreen shrub, requiring a cool, dry atmosphere. As it is very liable to rot off, water must be applied with great care. Propagated by cuttings of half-ripened wood, inserted in sand, under a hand glass; or by seeds.

B. verticillata (whorled). *fl.* yellow, large, with a whorl of narrow bracts beneath. Autumn. *l.* opposite, three-parted; segments linear-oblong. Branches slender, glaucous. *h.* 3ft. to 6ft. Chili, 1846. (B. M. 6170.)

BALCONY. A projection from the external wall of a house, usually resting on brackets, and having the sides encompassed by a balustrade. It should at all times be prettily decorated with plants, which in the summer is a comparatively easy matter. During winter, evergreens of various kinds are most serviceable, the best being Arbutus, Aucubas, Boxes, Euonymuses, Hollies, Irish and Goldon Yew, Portugal Laurel, Retinosporas, Vincas, &c. These may be grown in pots, and when replaced by the summer occupants, should be plunged in some reserve quarter, where they should receive plenty of water; by this means, they will increase in size, and keep in

a healthy condition. Very little water will be required during the winter. Climbing plants, such as Ivy, Passion Flower, Virginian Creeper, Climbing Roses, &c., are indispensable for covering the trellises, and draping the pillars and arches.

BALDINGERA. A synonym of **Premna**.

BALL. This term is used in reference to the roots and mass of earth as they are moulded into form and pressed into hardness by the pot. The masses of roots and earth which, in the case of fibrous-rooted subjects (such as Rhododendrons), must be taken intact when removing the plants, are also termed Balls.

BALM (*Melissa officinalis*). A perennial herb, often used in the manufacture of a drink for sick persons, and sometimes employed for culinary purposes. It may be grown in ordinary garden soil, and is propagated by divisions, in spring. A pretty variegated form is sometimes met with, having the additional advantage of being equal to the normal species for medicinal purposes.

BALM OF GILIAD. *See* **Cedronella triphylla** and **Populus balsamifera**.



FIG. 201. CAMELLIA-FLOWERED BALSAM.

BALSAM (*Impatiens Balsamina*). A well-known ornamental and tender annual, native of India. It is one of the showiest of summer and autumn flowers, and well deserves a place in every garden. Although of comparatively easy cultivation, good blooms and well-grown plants are far too rarely seen. A good Balsam bloom should be quite as double as a perfect Camellia, and to show to the greatest advantage should appear like one in the arrangement of the petals. To secure this, seeds should only be saved from the finest and most perfect flowers, although the quantity must, of necessity, be small. They

should be sown, about the third week in March, in properly prepared pans of rich sandy soil, and placed in a gentle bottom heat of about 65deg. As soon as the first rough leaf appears, the plants should be potted off into 3in. pots, care being taken to let the cotyledon, or seed leaves, be close to the soil. When the roots touch the sides of the pots, the plants should be moved into larger ones, and this should be repeated until they are in 8in. or 10in. pots. Some growers place one or two seeds in small pots, so as to avoid the first shift, and a good plan it is. During the time the plants are under glass, they should be kept as near the light as possible, and be frequently turned around, so that they do not draw to one side; and careful training must be given to those that are required in fine form. Disbudding is also necessary to such as are wanted at their best, removing all bloom from the main stem and base of branches until the plants are of sufficient size, and then the buds at the tops will bloom almost simultaneously. The buds that will be formed afterwards will cause a continuance of blossom for a long time, in fact, for some months, if the plants are liberally supplied with liquid manure. If it is desired for them to flower out of doors, the plants should be transferred, about May, to a frame where the heat is not above 50deg., and be kept in a steady growing state, air being admitted on all suitable occasions, cold winds and heavy rains avoided, and water supplied when needed; never allow them to get dry. They require training and disbudding the same as those grown in the greenhouse. About June, the plants should be fully exposed during the day; and, when danger of frost is over, the lights may be kept off altogether. These should bloom at the end of July. In all cases, plenty of drainage must be allowed, as the amount of water

required is very great. Insects must be sharply looked after, as well as slugs and snails. There are several sections, such as Camellia-flowered (see Fig. 201), Rose-flowered, &c., each containing variously striped, spotted, and entire coloured blooms, and it is best to pay an extra figure to secure a good strain.

BALSAM APPLE. *See* **Momordica Balsaminea**.

BALSAMINA. *See* **Impatiens**.



Fig. 202. Bambusa arundinacea.

BALSAMINEÆ. A tribe of plants belonging to the order *Geraniaceæ*. Sepals and petals all coloured, consisting of six segments, "two outer ones small, flat, and oblique; the next large, hood-shaped, ending below in a conical spur; the fourth opposite to it, small, very broad, concave; the two innermost very oblique, and more or less divided into two unequal

lobes." The best known genus is *Impatiens*.

BALSAMODENDRON (from *balsamon*—an old Greek word used by Theophrastus—balm or balsam, and *dendron*, a tree). ORD. *Burseraceæ.* Greenhouse or stove balsamiferous trees. Flowers small, green, axillary, often unisexual; calyx four-toothed, permanent; petals four, linear-oblong, induplicately valvate in æstivation; stamens eight, inserted under the annular disk, having elevated warts between them. Berry, or drupe, ovate, acute, one to two-celled, marked with four sutures. Leaves with three to five sessile, dotless leaflets. They thrive in a compost of thoroughly drained sandy loam. Propagated by cuttings of ripe young wood, taken in April, and placed under a hand glass, in bottom heat. The species named below doubtfully belongs to this genus, as the characteristics above enumerated will show.

B. zeylanicum (Ceylon).* *fl.* white, three-petaled, glomerated, involucrated; racemes interrupted, downy. *l.* impari-pinnate, with five to seven-stalked, ovate, acute leaflets. *h.* 30ft. Ceylon.

BALSAM OF CAPEVI. *See* **Copaifera**.

BALSAM-TREE. *See* **Clusia**.

BAMBOO CANE. *See* **Bambusa.**

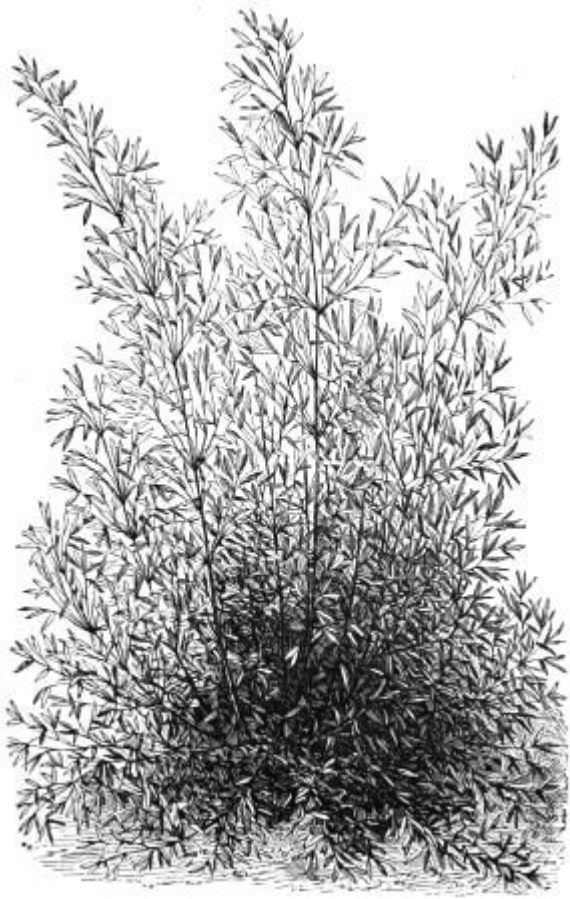


Fig. 203. Bambusa aurea.

BAMBUSA (from *bambu*, the Malay name). Bamboo Cane. Ord. *Gramineæ*. A genus of ornamental, shrubby, greenhouse, half-hardy or hardy shrubs, each culm flowering but once. Flowers usually hexandrous. Leaves, as a rule, relatively shorter than the stems, lanceolate, and narrowed at the base. Stems jointed, flexuose, branching, usually hollow, and, when mature, of a hard, woody nature. In well drained, sheltered situations, in the open, with rich,

loamy soil, some of the species make extremely graceful objects, particularly so in the more southern counties of England, and in parts of Scotland. Unless a very severe winter is experienced, they may be left without protection. Plants of all the species, however, should have the shelter of a cold greenhouse till about the end of April; when they should be gradually hardened off, and transferred to a warm, sheltered spot, such as in woodlands, by the margins of lakes, &c., as they like plenty of moisture during the summer. A good watering must be given after planting, to settle the soil. Propagation is effected by careful division of well-developed plants, which should be done in early spring, just as new growth is commencing; and it is advisable to establish the divisions in pots. *See also* **Arundinaria.**



Fig. 204. Bambusa nana.

B. arundinacea (reed-like).* Stem very stout, rising like a beautiful column to some 50ft. or 60ft. in height; the laterals producing a profusion of light green leaves, the whole presenting the appearance of a huge plume of feathers. India, 1730. This species is best treated as a stove plant, but it may be placed

out of doors in summer. See Fig. 202. (B. F. S. 321.)

B. aurea (golden).* *l.* lanceolate, acute, light green, distinguished from *B. nana* by having their under surface less glaucescent, and the sheath always devoid of the long silky hairs. China. This very handsome species forms elegant tufts, with its slender much-branched stems, which attain a height of from 6ft. to 10ft., and are of a light green colour in a young state, ultimately changing into a yellowish hue. Hardy in most parts of the country. See Fig. 203.

B. Fortunei (Fortune's).* *l.* linear-lanceolate, abruptly pointed, somewhat rounded at the base, on very short hairy stalks, serrated and often fringed with long hairs on the margin, downy on both sides, and distinctly variegated, the transverse veins often of a bottle-green colour. *h.* 1ft. to 2ft. Japan. A dwarf tufted species, with very slender stem. Quite hardy. There are only variegated varieties of this in cultivation, viz., *variegata* and *argenteovittata*. (F. d. S. 1863, t. 1535.)

B. glauca (milky-green). A synonym of *B. nana*.

B. japonica (Japanese). Synonymous with *Arundinaria*

Metake.

B. Maximowiczii (Maximowicz's). Synonymous with *Arundinaria Maximowiczii*.

B. Metake (Metake). Synonymous with *Arundinaria Metake*.

B. mitis (small). *l.* deep green, lanceolate, acute, striated, clasping the stem; panicle simple, erect, close; spikes long, imbricated. Stem tapering. *h.* 40ft. Cochin China and Japan. This vigorous-growing species can be cultivated out of doors during summer, and, in most localities, it may be left out all the year.

B. nana (dwarf).* *l.* lanceolate, acute, glaucous, stoutish, with the footstalks slightly downy. *h.* 6ft. to 8ft. India, 1826. A rather tender species, requiring to be grown in the stove or greenhouse. SYNS. *B. glauca* and *B. viridi-glaucescens*. See Fig. 204.

B. nigra (black). *See* **Phyllostachys nigra**.

B. Ragamowski (Ragamowsk's).* *l.* 9in. to 18in. long, and about 1in. to 3in. broad. China and Japan. This species "can readily be recognised by the tomentose line on one side of the midrib, running nearly the whole length of the leaf on the underside, this line being always on the longer

side of the leaf." Hardy. SYN. *B. tessellata*.

B. Simonii (Simon's).* *l.* narrow, nearly 6in. to 10in. long, occasionally striped with white. Stems growing with great rapidity, mealy-glaucous at the joints; branchlets numerous, rather closely crowded. *h.* 10ft. China and Japan, 1866.

B. striata (striated).* *l.* linear-oblong; culms striped yellow and green. *h.* 6ft. to 20ft. China, 1874. A very slender and graceful, rather tender, species. May be grown in the open air during summer, and in very favoured spots it is probably hardy, especially if covered with a mat in winter. It makes an excellent pot plant. SYN. *B. viridi-striata*. (B. M. 6079.)

B. tessellata (tessellated).* A synonym of *B. Ragamowski*.

B. violescens (nearly-violet).* *l.* green above, bluish-grey beneath, with an elongated ligule, surrounded by a bundle of black hairs. Stems much branched, blackish-violet. China, 1869. This handsome and vigorous species is intermediate between *Phyllostachys nigra* and *B. nana*. It requires protection during winter.

B. viridi-glaucescens (glaucous-

green). A synonym of *B. nana*.

B. viridi-striata (green-striped). A synonym of *B. striata*.

BANANA, or **PLANTAIN**. *See* **Musa**.

BANEBERRY. *See* **Actæa.**

BANISTERIA (named after John Baptist Banister, a traveller in Virginia in the seventeenth century, author of a catalogue of Virginian plants, inserted in Ray's "Historia Plantarum"). ORD. *Malpighiaceæ*. Stove trees or shrubs, frequently climbing. Flowers yellow; calyx five-parted; petals furnished with long stalks; stamens ten. Leaves simple, stalked. They are for the most part very ornamental, but are not often seen in flower in this country. They will grow in a mixture of loam, leaf soil, and peat, with some sharp sand added. Cuttings, made from ripened wood, will root freely in sandy soil, under a hand glass, in stove heat, taking about three or four weeks to do so.

B. chrysophylla (golden-leaved).* *fl.* deep orange, axillary, corymbose. *l.* ovate, oblong, acutish, somewhat sinuated towards the top, clothed beneath with golden shining down. Brazil, 1793. Climber.

B. ciliata (ciliated).* *fl.* large, orange-coloured, umbellate. June. *l.* cordate, orbicular, smooth, ciliated. Brazil, 1796. Twiner.

B. ferruginea (rust-coloured). *fl.* yellow; racemes panicled. June. *l.* 2in. long, ovate, acuminated, smooth above, and shining, rusty beneath,

and are, as well as the petioles, clothed with close pressed hairs. Brazil, 1820. Climber.

B. fulgens (glowing).* *fl.* yellow, in umbellate corymbs. *l.* ovate, acuminated, smooth above, and clothed with silky pubescence beneath, as well as the petioles. Branches dichotomous. West Indies, 1759. Climber.

B. Humboldtiana (Humboldt's).* *fl.* yellow; umbels lateral and terminal, sessile. *l.* roundish-ovate, cordate, rather acuminated, mucronate, membranaceous, smoothish above, clothed beneath with soft hoary down as well as the branchlets. South America, 1824. Climber.

B. sericea (silky). *fl.* yellow, racemose. July. *l.* ovate, obtuse, with a mucrone; younger ones downy on both surfaces, adult ones only on the under surface; down of a golden shining colour. Brazil, 1810. Climber.

B. splendens (splendid).* *fl.* yellow; racemes axillary, dichotomous, umbellate. Floral leaves orbicular, and nearly sessile. *l.* cordate, kidney-shaped, orbicular, clothed with silky down beneath. South America, 1812. Climber.

BANKS. These are usually formed with a view to increasing the amount of surface ground, and for the

acceleration or retarding of vegetable crops, such as strawberries, &c. They should be from 6ft. to 12ft. apart, according to the depth of soil, and run from east to west. In constructing Banks of a uniform size, great care, and a constant use of the garden line, will be found necessary. For the warmest side of the Banks, Dwarf French Beans, Peas, Vegetable Marrows, Cucumbers, New Zealand Spinach, Capsicums, &c., may be grown. On the opposite side, and when a prolonged supply is desired, Cauliflower, Broccoli, Lettuce, Turnip, Spinach, &c., may be sown thinly in drills, to be thinned out, and remain. It needs but little discretion to produce valuable crops by this method.

BANKSIA (named in honour of Sir Joseph Banks, once President of the Royal Society, and a distinguished patron of science, particularly of Natural History). ORD. *Proteaceæ*. Greenhouse evergreen shrubs, natives of Australia, principally grown for the beauty of their foliage. Leaves variable in form, usually dark green, clothed with white or rufous down beneath; margins deeply serrated or spinous, rarely entire. The following is the mode of culture recommended many years ago by Sweet. The pots should be well drained, by placing a potsherd about half way over the hole at the bottom of the pot, then laying another piece against it that it may be hollow, afterwards putting some smaller pieces all around them, and on the top of these some others broken very small. All the plants belonging to the order *Proteaceæ* should be drained in a similar manner, as the roots are very fond of running amongst the broken potsherds, and consequently there is less danger of their being overwatered. Care must also be taken not to allow them to flag, as they seldom recover if once allowed to get very dry. The

plants should be placed in an airy part of the house when indoors. Cuttings are generally supposed to be difficult to root, but this is not the case if properly managed. Let them be well ripened before they are taken off; then cut them at a joint, and place them in pots of sand, without shortening any of the leaves, except on the part that is planted in the sand, where they should be taken off quite close. The less depth they are planted in the pots the better, so long as they stand firm when the sand is well closed round them. Place them under hand glasses in the propagating house, but do not plunge them in heat. Take the glasses off frequently to give them air, and dry them, or they will probably damp off. When rooted, transfer to small pots; after which, place them in a close, unheated frame, and harden by degrees. Seeds are a very unsatisfactory means of multiplying the stock.

B. æmula (rivalling).* *l.* 6in. to 10in. long, 1in. broad, linear-oblong, tapering slightly at the base; edges deeply toothed, deep green on both sides; midrib of under surface clothed with rich brown hairs. *h.* 20ft. 1824. SYN. *B. elatior*. (B. M. 2671.)

B. australis (southern). A synonym of *B. marginata*.

B. Caleyi (Caley's). *l.* 6in. to 12in. long, linear, deeply and regularly toothed from base to apex, dark green above, paler below. *h.* 5ft. to 6ft. 1830. Said to be an elegant species.

B. collina (hill-loving).* *l.* 2in. to 3in. long, ½in. broad, linear; apex præmorse, as if bitten straight off; upper surface dark green, silvery below. *h.* 6ft. to 8ft. 1822. This forms a dense and handsome shrub, especially with its large head of yellow flowers. SYNS. *B. Cunninghami*, *B. ledifolia*, and *B. littoralis*. (B. M. 3060.)

B. Cunninghami (Cunningham's). A synonym of *B. collina*.

B. dryandroides (Dryandra-like).* *l.* 6in. to 10in. long, ¼in. broad, pinnatifid, divided almost to the midrib; lobes triangular, deep green above, and reddish-brown below. Stem clothed with reddish-brown hairs. *h.* 6ft. 1824. This plant is extremely graceful and elegant as a table decoration.

B. elatior (taller). Synonymous with *B. æmula*.

B. integrifolia (whole-leaved). *l.* cuneate-oblong, 6in. long, nearly 1in. wide at the broadest part; edges entire; upper side dark green, silvery white beneath. *h.* 10ft. to 12ft. 1788. SYNS. *B. macrophylla*, *B. oleifolia*. (B. M. 2770.)

B. i. compar (well-matched). *l.* very densely set upon the branches, oblong, tapering at the base, blunt at the apex; edges serrulate; upper side

dark olive green, silvery white beneath. *h.* 6ft., finely branching. 1824.

B. latifolia (broad-leaved). *l.* 6in. to 10in. long, 3in. broad, obovate-oblong; edges serrated; upper surface deep green, beneath clothed with woolly greyish hairs, those on the midrib bright brown. *h.* 20ft. 1802. (B. M. 2406.)

B. ledifolia (Ledum-leaved). Synonymous with *B. collina*.

B. littoralis (shore). Synonymous with *B. collina*.

B. macrophylla (large-leaved). Synonymous with *B. integrifolia*.

B. marginata (margined). *l.* 1in. to 2in. long, ½in. broad, blunt at the apex, armed with several short spines, and tapering at the base, deep green on the upper surface, snowy white beneath. *h.* 5ft. to 6ft. 1822. SYN. *B. australis*. (B. M. 1947.)

B. occidentalis (western).* *fl.* yellow, rather handsome, in spikes about 4in. long. April to August. *l.* 5in. to 6in. long, ¼in. broad. *h.* 5ft. 1803. West coast of New Holland. A beautiful species. (B. M. 3535.)

B. oleifolia (olive-leaved). Synonymous with *B. integrifolia*.

B. Solanderi (Solander's).* *l.* 4in. to

6in. long, and over 2in. wide, deeply pinnatifid, with three to six pairs of lobes on each leaf; apex as if bitten off; upper side dark green, under silvery white. *h.* 6ft. 1830.

B. speciosa (showy).* *l.* 8in. to 14in. long, about ½in. wide, pinnatifid, but divided almost to the midrib; lobes semicircular, with a spine on the end of each; upper side deep green, beneath silvery white, with the midrib clothed with ferruginous woolly hairs. *h.* 6ft. 1805. Both this and the preceding species are very handsome, and highly deserving of the most extensive culture.

B. quercifolia (Oak-leaved). *l.* cuneate-oblong, deeply incised at the margins, and having a short spine upon each lobe. *h.* 5ft. 1805. (B. R. 1430.)

BANKSIA (of Forster). A synonym of **Pimelea**.

BAOBAB-TREE. *See* **Adansonia**.

BAPHIA (from *baphe*, a dye; the tree produces the camwood of commerce). Camwood or Barwood. ORD. *Leguminosæ*. A stove tree, requiring a loam and peat soil. Cuttings, not deprived of any of their leaves, will root in a pot of sand, under a hand glass, in heat.

B. nitida (shining). *fl.* white; corolla with a roundish spreading vexillum, linear wings, which are about the length of the vexillum, and an acute

carina; pedicels two to three together, one-flowered, axillary. June. *l.* entire, oval-oblong, acuminated, shining. *h.* 30ft. Sierra Leone, 1793. (L. B. C. 367.)

BAPTISIA. (from *bapto*, to dye; so named from the economical use of some of the species). ORD. *Leguminosæ*. North American hardy herbaceous plants, with trifoliate, rarely simple leaves, and racemes of yellowish or blue flowers. They are somewhat shy bloomers, but grow freely in a loamy soil. Propagated by divisions, or, more easily, by seed, which latter may be sown in sand and leaf mould in the open, or in pots placed in a cold frame.

B. alba (white).* *fl.* white; racemes terminal. June. *l.* stalked, glabrous; leaflets elliptic-oblong, obtuse; stipules deciduous, subulate, shorter than the petioles. Branches divaricate. *h.* 2ft. 1724. (B. M. 1177.)

B. australis (southern).* *fl.* blue; racemes few-flowered, elongated, shorter than the branches. June. *l.* stalked, smooth; leaflets oblong-cuneated, obtuse, four times longer than the petiole; stipules lanceolate, acute, twice the length of the petiole. Stem branched, diffuse. *h.* 4ft. to 5ft. 1758. (Flora, 1856, 2; B. M. 509.)

B. confusa (confused). *fl.* dark blue, alternate, bracteate; racemes elongated. June. *l.* stalked, smooth;

leaflets oblong-cuneated or obovate; stipules linear-lanceolate, twice the length of the petioles. Stem branched. *h.* 1ft. to 2ft. 1758.

B. exaltata (exalted).* *fl.* deep blue; racemes many-flowered, elongated, twice the length of the branches. June. *l.* ternate, stalked; leaflets lanceolate-obovate, five times longer than the petioles; stipules lanceolate, acuminated, three times longer than the petioles. Stem erect, branched. *h.* 3ft. to 4ft. 1812. (S. B. F. G. 97.)

B. leucophæa (dusky-white). *fl.* cream-coloured; racemes many-flowered, lateral, with the flowers leaning to one side. July. *l.* sessile, somewhat villous; leaflets rhomboid-obovate; stipules and bracts ovate, acute, broad, leafy. *h.* 1ft. 1870. (B. M. 5900.)

B. minor (less). *fl.* blue; racemes axillary, bracteate. June. *l.*, leaflets rhomboid-lanceolate; stipules lanceolate, longer than the petioles. Stem erect, solid. *h.* 1ft. to 2ft. 1829.

B. perfoliata (perfoliate-leaved).* *fl.* yellow, small, axillary, solitary. August. *l.* perfoliate, roundish, quite entire, rather glaucous. *h.* 3ft. 1793. (B. M. 3121.)

B. tinctoria (dyers').* *fl.* yellow, with wings each furnished with a callosity, or lateral tooth; racemes

terminal. *l.* stalked, upper ones nearly sessile; leaflets roundish-obovate; stipules setaceous, almost obsolete. *h.* 2ft. to 3ft. 1759. (L. B. C. 588.)

BARBACENIA. (named after M. Barbacena, a Governor of Minas Geraes). Formerly placed in ORD. *Hæmodoraceæ*, but now referred by Bentham and Hooker to *Amaryllidaceæ*. Very singular and pretty stove evergreen herbaceous perennials, allied to *Vellozia*. Flowers purple, large, showy; perianth funnel-shaped, resinosely hairy on the outside; limb spreading; scapes one-flowered, usually clothed with glandular hairs. Leaves firm, spiral, spreading, acutely keeled. Lindley says that they are capable of existing in a dry, hot air without contact with the earth, on which account they are favourites in South American gardens, where, with Orchids and Bromeliads, they are suspended in the dwelling houses, or hung to the balustrades of the balconies, in which situation they flower abundantly, filling the air with their fragrance. They are rarely seen in our gardens. They may be grown in baskets of fibrous loam and peat, with some nodules of charcoal added.



FIG. 205. FLOWER OF BARBACENIA PURPUREA.

B. purpurea (purple).* *fl.* funnel-shaped, six-cleft, terminal, solitary; ovarium elongated, tuberculated. July. *l.* linear, keeled, with spiny serratures. *h.* 1½ft. Brazil, 1825. See Fig. 205. (B. M. 2777.)

B. Rogieri (Rogers').* *fl.* purple; scape and ovaria tubercled; filaments broad, bifid. July. *l.* linear, acuminated, imbricate, with broad stem-clasping bases, finely spinely serrated on the margin, and keel recurved; caudex short. *h.* 1½ft. Brazil, 1850. (L. J. F. 82.)

BARBADOS CHERRY. *See* **Malpighia**.

BARBADOS GOOSEBERRY. *See* **Pereskia aculeata**.

BARBADOS LILY. *See* **Hippeastrum equestre**.

BARBAREA (anciently called Herb of St. Barbara). Winter Cress; American Cress. ORD. *Cruciferæ*. Hardy glabrous perennial herbs. Flowers yellow; racemes erect, terminal. Stems erect. They are of easy culture, but scarcely worth growing in the pleasure garden. Propagated by cuttings, suckers, divisions, or seeds.

B. præcox (early). *l.*, lower ones lyrate; terminal lobe ovate; upper ones pinnate-parted; lobes linear-oblong, quite entire. *h.* 1ft. to 1½ft. Commonly known as American, or Black American Cress. Here and there on roadsides, and in dry gravelly places in Great Britain. An escape from cultivation. (Sy. En. B. 124.)

B. vulgaris (common). *l.*, lower ones lyrate; terminal lobe roundish; upper ones obovate, toothed, or pinnatifid. *h.* 1¼ft. The double flowering form of this native species is the only one of this genus worth growing for beauty; it is generally known as Double Yellow Rocket. The variegated form is also rather pretty, and comes true from seed. (Sy. En. B. 120.)

BARBATUS. Having long weak hairs, in one or more tufts; bearded.

BARBERRY. *See* **Berberis**.

BARBIERIA (in honour of J. B. G. Barbier, M.D., a French physician and naturalist, author of "Principes

Generaux de Pharmacologie ou de Matière Medicale," Paris, 1806). ORD. *Leguminosæ*. An ornamental stove evergreen, requiring a mixture of peat, loam, and sand. Propagated by cuttings of half-ripened wood, which should be placed in sand, under a glass, in stove heat.

> **B. polyphylla** (many-leaved).* *fl.* scarlet, 2in. long; racemes axillary, few-flowered, shorter than the leaves. *l.* impari-pinnate, with nine to eleven pairs of elliptic-oblong, mucronate leaflets, pubescent in an adult state. Porto Rico, 1818. SYNS. *Clitorea polyphylla* and *Galactia pinnata*.

BARBS. Hooked hairs.

BARK. The outer integuments of a plant beyond the wood, and formed of tissue parallel with it.

BARK-BOUND. This condition is generally the result of very rich soil, or insufficient drainage. In most fruit trees a gummy exudation takes place. If caused by stagnancy, thorough drainage should immediately be effected. Scrubbing the stem is also recommended. Slitting the bark with a knife is likely to do more harm than good, particularly so in the hands of the inexperienced.

BARKERIA (name commemorative of the late G. Barker, of Birmingham, an ardent cultivator of orchids). ORD. *Orchidaceæ*. From a scientific point of view, this genus should be included in *Epidendrum*. Very handsome, deciduous, epiphytal, cool-house orchids, having slender pseudo-bulbs, from 6in. to 12in. high, from the top of which the numerous

flower-stems are produced. In a cool, airy temperature, these plants grow vigorously, suspended in pans or small baskets close beneath the glass, and slightly shaded with tiffany. They succeed well also on flat blocks of wood, on the top of which they should be tied, without any moss, as their freely-produced, thick, fleshy roots soon cling to the blocks. During the season of growth, a good supply of water is needed, and in hot weather it may be applied three or four times daily; the blocks and plants are best immersed in water; but when at rest, a slight watering twice or three times a week will suffice. Propagated by divisions, just previous to the commencement of new growth.

B. elegans (elegant).* *fl.* in loose racemes, four or five in each; each blossom about 2in. across; sepals and petals dark rose; lip reddish crimson, spotted and edged with a lighter colour. Winter. *h.* 2ft. Mexico, 1836. Of this beautiful slender-growing species, there are two or three varieties in cultivation. (B. M. 4784.)

B. Lindleyana (Lindley's).* *fl.*, raceme 2ft. long, very slender, bearing from five to seven blossoms near its apex; sepals and petals rosy purple; lip white, with a deep purple blotch at its apex. September, remaining in beauty for a considerable time. *h.* 2ft. Costa Rica, 1842. (B. M. 6098.)

B. L. Centeræ (Center's).* *fl.* rosy lilac; lip oblong; margins crenulated

or crisped; apex blotched deep purple. Costa Rica, 1873.

B. melanocaulon (dark-stemmed).* *fl.* on an erect spike; sepals and petals rosy lilac; lip broader at the base than at the top, reddish-purple, having a blotch of green in the centre. August. *h.* 1ft. Costa Rica, 1848. Very rare.

B. Skinneri (Skinner's).* *fl.* deep rose-coloured; spikes 6in. to 9in. long, from the apices of the ripened growth, often branched, forming a dense mass of deep purple blossoms, which, if kept dry, lasts from eight to ten weeks. *h.* 1½ft. Guatemala. (P. M. B. 15, 1.)

B. S. superbum (superb).* *fl.* dark rose; lip somewhat deeper tinted, and marked towards the base with yellow streaks. Guatemala. This far surpasses the type in size and number of flowers, as well as in brilliancy of colour. (W. S. O. 38.)

B. spectabilis (showy).* *fl.* quite 2in. across, produced eight or ten together, on a spike issuing from the top of the pseudo-bulb; sepals and petals oblong, acuminate, rosy lilac; lip white, margined with deep lilac or rosy purple, and dotted or spotted with crimson. This very distinct and desirable species lasts from eight to ten weeks in beauty, and forms a very handsome object when placed

in the drawing-room and covered over with a large glass shade. Guatemala, 1843. (B. M. 4094.)

BARKING-IRONS. Instruments used in taking off the bark of trees.

BARKLYA (named after Sir H. Barkly, formerly Governor of South Australia). ORD. *Leguminosæ*. A large greenhouse tree, thriving in a compost of loam and leaf mould. Propagated by seeds and cuttings; the latter should be half ripened, and placed in sandy soil, under a bell glass, in a cool house.

B. syringifolia (Syringa-leaved). *fl.* golden yellow, numerous, disposed in axillary or terminal racemes. *l.* alternate, simple, coriaceous. *h.* 30ft. Moreton Bay, 1858.

BARK STOVE. A hothouse adapted for moisture-loving exotics, and having a pit from 2ft. to 4ft. deep, containing fermenting matter, chiefly tanners' bark, by which means a steady heat is maintained for a considerable time. The Bark Stove is now almost obsolete. Bark is, however, still largely used in pine pits, and in some propagating beds; but such beds are generally superseded by hot-water or hot-air tanks.

BARLERIA (named after J. Barrelier, a French botanist of the seventeenth century). ORD. *Acanthaceæ*. A genus of interesting and ornamental stove evergreen shrubs. Flowers axillary or terminal; calyx four-sepaled, the two outer larger than the others. They thrive best if grown in loam and peat, with a little rotten dung added. Propagated by cuttings made of the young wood, and placed in a

similar compost, under a bell glass, in stove temperature, with bottom heat.

B. flava (yellow).* *fl.* yellow, aggregate, terminal, tubular; bracts very narrow, setose. Summer. *l.* lanceolate, hairy, entire. Plant unarmed. *h.* 3ft. India, 1816. SYN. *B. mitis*. (B. M. 4113.)

B. Gibsoni (Gibson's). *fl.* pale purple, rather large, sub-terminal. Winter. *l.* ovate or oblong-lanceolate. India, 1867. A glabrous stove shrub, of branched habit. (B. M. 5628.)

B. Leichtensteiniana (Leichtenstein's).* *fl.* very curious; spikes axillary, 2in. to 3in. long, ovoid or oblong, consisting of a large number of closely packed overlapping bracts, all turned to the fore or lower part of the spike; bracts ovate-acuminate, mucronate, spine-toothed, one-ribbed, with prominent and curved veins, and 1in. to 1½. long. *l.* opposite, 1in. to 2in. long, linear-lanceolate, entire, mucronate, tapering at the base into a very short stalk. Branches slender, virgate, sub-angular. South Africa, 1870. This plant is covered over its whole surface with close, white, hoary down. (G. C. 1870, p. 73.)

B. longifolia (long-leaved). *fl.* white; spines of whorls six. Summer. *l.* ensiform, very long, rough. *h.* 2ft.

India, 1781. This is a biennial.

B. lupulina (Hop-headed). *fl.* yellowish; spikes ovate; bracts ovate, concave, imbricated. August. *l.* lanceolate, quite entire; spines simple, spreading. *h.* 2ft. Mauritius, 1824.

B. Mackenii (MacKen's).* *fl.* purple, large, in a terminal raceme. Spring. *l.* recurved, narrow-ovate, or elliptic-lanceolate, sub-acute, petioled. Natal, 1870. (B. M. 5866.)

B. mitis (small). Synonymous with *B. flava*.

B. prionitis (Prionitis-like). *fl.* orange; spines axillary, pedate, in fours. Summer. *l.* quite entire, lanceolate-ovate. *h.* 3ft. India, 1759.

BARLEY. *See* **Hordeum vulgare**.

BARNADESIA (named after Michael Barnadez, a Spanish botanist). ORD. *Compositæ*. Pretty greenhouse deciduous shrubs, requiring a dry atmosphere. They should be grown in peat, loam, and sand, in equal proportions. Propagated either by seeds, sown in hotbeds in March, or by cuttings, made of half-ripened wood in April, and placed in sand under a bell glass.



Fig. 206. Barnadesia rosea.

B. rosea (rosy).* *fl.-heads* rose-coloured, solitary, ovate-cylindrical, downy, sessile; florets bilabiate, one lip oblong-emarginate, villous, the other filiform; hairs on receptacle twisted; pappus stiff, plumose. May. *l.* alternate, ovate, acute at both ends. *h.* 1½ft. South America, 1840.

See Fig. 206. (B. M. 4232.)

BARNARDIA. Included under **Scilla** (which *see*).

BAROMETER. An instrument for measuring the density of the atmosphere, and hence determining the probable changes of weather, or the height of any ascent. To the gardener the Barometer is indispensable as a warning to take due precaution.

BAROSMA (from *barys*, heavy, and *osme*, smell; referring to the powerful scent of the leaves). Name often incorrectly spelt *Baryosma*. SYN. *Parapetalifera*. ORD. *Rutaceæ*. Very pretty small, Heath-like, greenhouse evergreen shrubs, from the Cape of Good Hope. Calyx equally five-parted; petals five, oblong; stamens ten. Leaves opposite or scattered, coriaceous, flat, dotted, with their margins sometimes glandularly serrulated, sometimes almost entire or revolute. They thrive in a mixture of sand, peat, and a little turfy loam, with good drainage and firm potting. Cuttings, taken from ripened wood, inserted in a pot of sand, and placed in a shady position in a cool house, with a bell glass over them, will root readily in a few weeks.

B. betulina (Birch-leaved). *fl.* white, axillary, solitary. February to September. *l.* opposite, obovate, serrulate, sessile, spreading. *h.* 1ft. to 3ft. 1790. (B. M. Pl. 45.)

B. dioica (diœcious).* *fl.* purplish; peduncles axillary, usually in threes, shorter than the leaves. April. *l.* scattered; upper ones ternate, lanceolate, tapering to both ends, full of glandular dots, spreading. *h.*

1ft. to 2ft. 1816. (B. R. 502.)

B. latifolia (broad-leaved). *fl.* white, usually solitary, lateral. July. *l.* opposite, ovate-oblong, sessile, serrulated, smoothish, without glandular dots; branches villous. *h.* 1ft. 1789.

B. pulchella (pretty).* *fl.* pale red or purple; peduncles axillary, usually solitary, exceeding the leaves. February. *l.* crowded, ovate, quite smooth, with thickened, crenate-glandular margins. *h.* 1ft. to 3ft. 1787.

B. serratifolia (saw-edged-leaved).* *fl.* white; peduncles axillary, sub-divided. March to June. *l.* nearly opposite, lanceolate, stalked, glandularly serrulated, smooth. *h.* 1ft. to 3ft. 1789. (B. M. 456, and B. Z. 1853, 12.)

BARRED. Marked in spaces with a paler colour, resembling bars.

BARREN FLOWERS. The male or staminate flowers of many plants, such as the Cucumber, Melon, &c., are popularly known as Barren Flowers, *i.e.*, they produce no fruit. This condition is, in some respects, similar to "blind" Strawberries or "blind" Cabbages, so far as fruition is concerned, but structurally and functionally it is widely different. The Barren Flowers of the Cucumber, Melon, &c., are produced by what are known as monœcious plants, *i.e.*, having male and female organs in different flowers, but on the same plant. In the Strawberry, &c., Barren

Flowers are generally the result of unfavourable surroundings, or unskilful cultivation. A good example of Barren Flowers is seen in the ray-florets of many Composite plants, which are frequently really neuter, having neither male nor female organs.

BARREN SOILS. A term signifying such soils as are normally unprofitable. The term can only be correctly applied in very few cases; as almost any soil may be rendered capable of affording a basis for some kind of vegetable life, arboreal or other. The question of planting up the enormous quantity of what is now waste land, might well engage the most practical consideration. Of course, the natural state of any land will, to a great extent, determine what would be its ultimate condition, after all that could be effected by mechanical agency has been accomplished. Drainage, irrigation, enrichment, pulverisation, are all matters which can only be considered upon a particular basis; but we doubt not that the thousands of acres of land now practically almost useless, might, by the adoption of proper means, be rendered fairly remunerative.

BARREN-WORT. *See* **Epimedium**.

BARRINGTONIA (named after the Hon. Daines Barrington, F.R.S.). ORD. *Myrtaceæ*. A genus of stove evergreen trees and shrubs, very difficult to cultivate. Flowers large, racemose. Leaves opposite or whorled, generally obovate; margins toothed or entire. Fruit one-seeded, fleshy. They require a compost of two parts loam, one peat, and one sand. Water should be given in abundance, and a moist atmosphere at all times maintained, the temperature ranging from 65deg. to 95deg. Propagated by cuttings obtained from the lateral shoots; these, taken off at a joint when the wood is ripe, planted in sand, with a hand

glass over them, root readily. The cuttings should not be stripped of any of their leaves.

B. racemosa (raceme-flowered). *fl.* red; racemes pendulous, very long. *l.* cuneate-oblong, acuminated, serrulated. *h.* 30ft. Malabar, 1822. (B. M. 3831.)

B. speciosa (showy).* *fl.* purple and white, large and handsome, disposed in an erect thyrse. *l.* shining, cuneate-oblong, obtuse, quite entire. *h.* 20in. to 30in. in England. This beautiful species seldom attains a height of more than 6ft. or 8ft. (G. C. 1845, p. 56.)

BARROW. Garden Barrows are very numerous, both with and without wheels. The Flower-pot Barrow has a wheel and a flat surface, on which plants, pots, or leaves are placed, either directly, or, when small, in shallow baskets. The Haum Barrow is an open box or case, of wicker or other work, placed on, or suspended from, a pair of handles, with or without a wheel, and is useful for carrying litter, leaves, &c. The Water Barrow, instead of a box, contains a barrel, tub, or cistern, in which fluid manure, or ordinary water, is conveyed to different parts of the garden. The Hand-barrow is a frame of wood, carried by two levers, which form four handles; for removing large pots or tubs of trees or shrubs it is very useful.



Fig. 207. Flower of Bartonia aurea.

BARTLINGIA. A synonym of **Plocama** (which *see*).

BARTONIA (in honour of Benjamin S. Barton, M.D., formerly Professor of Botany at Philadelphia). Ord. *Loasaceæ*. Hardy annuals or biennials, downy, with stiff and bearded hairs. This genus is now placed under *Mentzelia* in most standard botanical works. Flowers white or yellow, large, terminal, expanding in the evening, when they are very fragrant, and becoming reddish as they fade. Leaves alternate, interruptedly pinnatifid. The species are very showy, and well worth growing. Any ordinary garden soil suits them. Seeds should be raised in a gentle heat in spring; and, when the seedlings are sufficiently large, they should be potted singly into small, well-drained pots. In winter, they should be placed on a dry shelf in a greenhouse or frame. *B. aurea* is one of the brightest of hardy annuals, and may be sown either

in a frame, or in the open border in April.

B. albescens (whitish).* *fl.*, petals ten, pale yellow, disposed in a leafy panicle. July. *l.* sinuately toothed. Stem with a white shining epidermis. *h.* 1ft. to 4ft. Chili, 1831. Annual or biennial. (S. B. F. G. ii., 182.)

B. aurea (golden).* *fl.* two or three together, terminal, bright golden yellow, as large as a half-crown; petals five. June. *h.* 1ft. California, 1834. Annual. See Fig. 207. (B. M. 3649.)

B. nuda (naked) and **B. ornata** (adorned) are two very pretty white-flowered biennial species. *h.* 2ft. Missouri, 1811.

BARYOSMA. *See* **Barosma**.

BASAL, or **BASILAR**. Situated at the base of anything; as the embryo, when situated at the bottom of the seed.

BASELLA (its Malabar name). Malabar Nightshade. ORD. *Basellaceæ*. Annual or biennial stove trailers, with white or pinkish flowers, of no great horticultural value. In India, and elsewhere throughout the tropics, some of the species are cultivated as pot herbs, and are used as a substitute for Spinach.

B. alba (white).* *fl.* white. August. *l.* heart-shaped, pointed. *h.* 8in. India, 1688. This plant, either when

allowed to fall in festoons from the roof of a warm house, or treated as a basket plant, forms an elegant object when in flower.

BASELLACEÆ. A series of usually herbaceous climbers, and considered a tribe of *Chenopodiaceæ*.

BASIL, SWEET (*Ocymum basilicum*). This is a tender annual from India, and must be raised in gentle heat. The foliage is somewhat largely used for flavouring purposes. Seeds should be sown in April, the seedlings pricked out into boxes to strengthen, and finally planted out about 8in. asunder, in beds of light rich soil, in June, being well watered until fully established. As soon as they bloom, they should be cut down to within a few inches of the ground, and the portions cut off should be tied up in small bunches and dried in the shade for winter use. Some of the plants can be lifted in September, potted up, and placed in a warm greenhouse for the winter, when the fresh green leaves will be found very useful. Bush Basil (*Ocymum minimum*) is a dwarfer plant, but may be treated in the same way. Wild Basil is botanically known as *Calamintha Clinopodium*.

BASIL-THYME. *See* **Calamintha Acinos**.

BASI-NERVED. When the nerves of a leaf spring from the base.

BASING-UP. The raising of a small bank of earth entirely round a plant, so as to retain water immediately about the root. The term is sometimes used to signify **Earthing** or **Moulding**, which *see*.

BASKETS. Few objects contribute more to the adornment of a window, or the decoration of the

diningroom, drawing-room, or glass-house, than Hanging Baskets, tastefully filled with handsome foliaged and flowering plants. Baskets are made in different forms and of various materials, such as wire, terra-cotta, wood, and cork. The Wire Baskets have a very light and elegant appearance, and are generally used. In filling Baskets, the inside should be lined with a thick layer of moss, or *Selaginella Kraussiana*, next to which a layer of coarse sacking must be placed, to prevent the soil from working through. Terra-cotta Baskets are very pretty, and are extensively employed in domestic rooms, but they should always have one or more holes at the bottom, to facilitate drainage. Rustic Baskets, of cork or wood, are also very suitable for floral arrangements; those composed of teak-wood are very generally used for orchids. The compost should be prepared according to the requirements of the plant or plants intended to be grown, which can be easily ascertained on reference to such plants in this work. The soil should not be allowed to get dry; in the event of this happening, however, a thorough soaking by immersion must be given. As a rule, attention should be given in the matter of watering every other day, and light syringing every morning and evening during the spring and summer months will be most beneficial. The Baskets should be examined every week, all dead or decaying leaves being removed, and any insects, which are so likely to get a foothold, destroyed. In arranging the subjects, the centre plant should be the tallest, the next outer ones shorter, and the marginal ones of a trailing or drooping habit, so that the whole may present a symmetrical, and at the same time a natural, appearance. Wickerwork Baskets are used for carrying or transferring plants, and are generally

made 18in. wide by 20in. deep; they are extremely useful, and should be in every garden. Split wood and withes are largely employed in making Baskets. The Planter's Basket, described by Loudon as a flat, rectangular utensil of wickerwork or boards, partitioned into three or more parts, for the purpose of carrying with the gardener when about to plant or remove plants, is now, unfortunately, almost obsolete. One division is for the plants, another for those taken up, and a third for the tools to be made use of, and for any decayed parts of plants, stones, weeds, or other refuse which may be collected. By using this Basket, order, accuracy, and neatness are secured. The Sussex "Truck" Baskets, made of willow-wood, are very useful, being both light and durable. *See also* **Measures**.

BASSIA (named after Ferdinando Bassi, Curator of the Botanic Garden at Bologna). ORD. *Sapotaceæ*. Handsome lofty-growing lactescent stove trees, with axillary, solitary, or aggregate flowers, and quite entire, smooth, coriaceous leaves. They require stove heat, and a compost of peat and loam. Cuttings, taken from ripened wood, strike readily in sand, under a hand glass, in a strong moist heat.

B. butyracea (buttery). The Indian Butter Tree. *fl.*, pedicels aggregate, and are, as well as the calyces, woolly. *l.* obovate, 8in. to 9in. long, and 4in. to 5in. broad, tomentose beneath. *h.* 30ft. to 70ft. Nepaul, 1823. (B. F. F. 35.)

B. latifolia (broad-leaved). The Mahwah Tree of Bengal. *fl.*, corolla thick and fleshy; pedicels drooping, terminal. *l.* oblong or elliptic,

smooth above, whitish beneath, 4in. to 8in. long, and 2in. to 4in. broad. *h.* 50ft. India, 1799. (B. F. S. 41.)

B. longifolia (long-leaved). *fl.*, pedicels axillary, drooping, crowded round the ends of the branchlets. *l.* ovate-lanceolate, approximate at the tops of the branches, 6in. long, deciduous. *h.* 50ft. Malabar, 1811. (B. F. S. 42.)

BASS or **BAST MATS**. These are prepared, chiefly in Russia, from the inner bark of various Limes (*Tilia*), and are very largely used in this country by nurserymen for packing purposes. They are also extensively employed as coverings, being excellent preventatives of the effects of frost. They are beneficial as a covering for beds of early vegetables, to prevent radiation during the night. For tying purposes they are now greatly superseded by Raffia Grass. Archangel Mats are larger, and of better quality than the St. Petersburgh. Dunnage Mats are heavy, and generally used for covering, as they are much cheaper.

BASTARD ACACIA. *See* **Robinia Pseudo-acacia**.

BASTARD BALM. *See* **Melittis**.

BASTARD BOX. *See* **Polygala chamæbuxus**.

BASTARD CABBAGE-TREE. *See* **Geoffroya**.

BASTARD CHERRY. *See* **Cerasus Pseudo-cerasus**.

BASTARD CINNAMON. *See* **Cinnamomum Cassia**.

BASTARD CORK TREE. *See* **Quercus pseudo-suber**.

BASTARD INDIGO. *See* **Amorpha**.

BASTARD LUPINE. *See* **Trifolium Lupinaster**.

BASTARD QUINCE. *See* **Pyrus Chamæmespilus**.

BASTARD VERVAIN. *See* **Stachytarpheta**.

BASTARD VETCH. *See* **Phaca**.

BASTARD WIND-FLOWER. *See* **Gentiana Pseudo-pneumonanthe**.

BASTARD WOOD-SAGE. *See* **Teucrium Pseudo-scorodonia**.

BAST MATS. *See* **Bass Mats**.

BATATAS (its aboriginal name). ORD. *Convolvulaceæ*. This genus is now referred to *Ipomœa*. Strong, free-growing, greenhouse or stove deciduous twiners. Calyx of five sepals; corolla campanulate; stamens inclosed. They are of easy culture, only requiring plenty of room to spread, and are well adapted for trellis work, or to run up pillars. They are all tuberous rooted, and therefore require to be kept dry when in a dormant state. A rich, open, loamy soil is most suitable. Young cuttings strike readily under a hand glass, in heat.

B. bignonioides (Bignonia-like).* *fl.*, corolla dark purple, funnel-shaped, with a curled limb; peduncles many-flowered, nutant, shorter than the petioles. July. *l.* three-lobed; hind lobes rounded, imbricate. Cayenne, 1824. (B. M. 2645.)

B. Cavanillesii (Cavanilles').* *fl.* pale whitish-red; lobes of corolla obtuse, crenulated; peduncles one to three-flowered. August. *l.* quinate;

leaflets ovate, entire, unequal. Native country unknown, 1815.

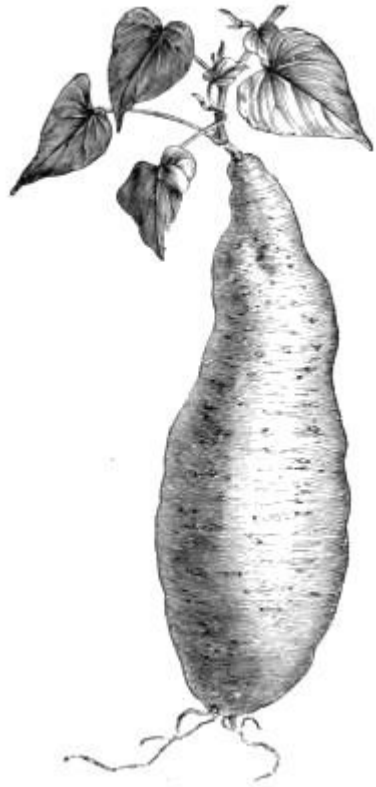


Fig. 208. Batatas edulis, showing Tuber.

B. edulis (edible).* Sweet Potato. *fl.*, corolla 1in. long, white outside and purple inside; peduncles equal in length to the petioles, or exceeding them, three to four-flowered. *l.* variable, usually angular, also lobed. Stem creeping, rarely climbing. East Indies, 1797. See Fig. 208.

B. glaucifolia (milky-green-leaved). *fl.*, corolla small, purplish, with an inflated tube, and ovate, acute segments; peduncles two-flowered, length of leaves. May. *l.* sagittate, truncate behind, on long petioles. Mexico, 1732.

B. heterophylla (various-leaved). *fl.* blue; peduncles solitary, axillary, bearing each three sessile flowers. July. *l.* quinately palmate; lobes or leaflets ovate-spathulate, acute. Plant very villous. Cuba, 1817.

B. paniculata (panicled).* *fl.* large, purple; peduncles much exceeding the petioles, many-flowered, dichotomously and corymbosely panicled. June *l.* palmate, five to seven-cleft; lobes ovate-lanceolate or elliptic, bluntish, rarely sub-acuminated. India, 1799. (G. C. n. s., x., 341.)

B. senegalensis (Senegalese). *fl.* white or purplish, large; peduncles three-flowered. June. *l.* quinately palmate; lobes ovate, obtuse, middle one the largest. Stem white, tubercular. Guinea, 1823.

B. venosa (veiny). *fl.* purple; peduncles umbellate, with an ovate-cordate, solitary leaf at the base of each pedicel. July. *l.* digitately quinate; leaflets petiolate, acuminated, quite entire. France, 1820.

BATEMANNIA (named after Mr. J. Bateman, a collector and cultivator of orchids, and author of a "Monograph of Odontoglossum," and other works on orchidaceous plants). ORD. *Orchidaceæ*. A small and easily-grown genus of dwarf, compact-growing epiphytes, closely allied to *Maxillaria*, but differing from that genus in having the anther-bed with a membranous border. They may be grown in pots, in a compost of peat and moss, or on blocks of wood with moss. They require an intermediate house and plenty of water in the growing season. Propagated by divisions and offsets. They have generally a free-flowering habit; but some of the species are not so ornamental as many other orchids.

B. armillata (braceleted). *fl.* green, white. 1875. (R. X. O. 316.)

B. Burtii (Burt's). *fl.* red-brown, yellow base, 3in. across; lip white, tipped chocolate. Autumn. *l.* elliptic-oblong, or ligulate, sub-distichous. Plant bulbless. Costa Rica, 1872. (B. M. 6003.)

B. Colleyi (Colley's). *fl.* on a pendulous raceme, rising from the base of the pseudo-bulbs; sepals and petals brownish-purple within, green without; lip white. Autumn. *h.* 6in. Demerara, 1834. (B. R. 1714.)

B. grandiflora (large-flowered).* *fl.*, flower-spike coming up with the young growth, bearing three or four flowers, of curious structure; sepals and petals olive-green, striped with reddish-brown; lip white, with

reddish-purple streaks, orange or yellow towards the base. Pseudo-bulbs ovate, 3in. or 4in. long, and bearing two large, broad, leathery leaves. New Grenada, 1866. (B. M. 5567.)

B. Wallisii (Wallis').* *fl.*, sepals light greenish-yellow outside, olive-green to chestnut-brown inside, with some yellow at the base; petals with scarlet stripes at the very base, but otherwise coloured like the sepals; lip blade greenish, with a brownish hue at the anterior part; peduncles slender, corymbose. *h.* 1ft. Columbia, 1876.

BATSCHIA. *See* **Lithospermum**.

BAUERA (named after Francis and Ferdinand Bauer, German botanical draughtsmen). ORD. *Saxifragaceæ*. Small shrubs, natives of Australia, New Zealand, &c. Flowers axillary, solitary, pedunculate. Leaves six in a whorl, approximating by threes, and therefore, as it were, opposite and ternate, exstipulate. Easily cultivated in a compost of sandy loam and peat. Propagated by cuttings, placed in sandy soil, under a glass. These very pretty little greenhouse evergreens flower nearly the whole year through.

B. humilis (low). *fl.*, corolla red, one-half smaller than *B. rubioides*, and the plant is altogether much smaller. July to December. *l.* oblong, crenated. *h.* 1ft. New South Wales, 1804. (L. B. C. 1197.)

B. rubiæfolia (madder-leaved). Synonymous with *B. rubioides*.

B. rubioides (madder-like).* *fl.* pale red, or pink. *l.* lanceolate, crenated. *h.* 1ft. to 2ft. New South Wales, 1793. SYN. *B. rubiæfolia*. (A. B. R. 198.)

BAUHINIA (in honour of John and Caspar Bauhin, two famous botanists of the sixteenth century). Mountain Ebony. ORD. *Leguminosæ*. Very showy stove evergreen shrubs. Flowers racemose; petals five, spreading, oblong, rather unequal, upper one usually distant from the rest. Leaves two-lobed, constantly composed of two jointed leaflets at the top of the petiole, sometimes nearly free, but usually joined together, more or less, and with an awn in the recess. They succeed well in a mixture of sand, loam, and peat, requiring good drainage and moderately firm potting. Propagated by cuttings, which should be taken when the wood is neither very ripe nor very young; the leaves must be dressed off, and the cuttings planted in sand, under a glass, in moist heat. Although glorious objects in the tropics, few of the species flower under our comparatively sunless skies; those which hitherto have succeeded well in Britain are marked with an asterisk.

B. acuminata (taper-pointed-leaved). *fl.* pure white; petals broadly ovate, hardly stipitate. June. *l.* rather cordate at the base, smoothish; leaflets connected beyond the middle, ovate, acuminated, parallel, four-nerved. *h.* 5ft. to 6ft. Malabar, 1808.

B. aurita (eared). *fl.* white; petals ovate, on short stipes. August. *l.* glabrous, cordate at the base; leaflets connected the fourth part of their length, oblong-lanceolate, nearly parallel, six to eight-nerved. *h.* 4ft. to 6ft. Jamaica, 1756.

B. corymbosa (corymbose).* *fl.* in loose racemes; petals pinkish, regular, crenulated at the edge. Summer. *l.*, leaflets semi-oval, obtuse, parallel, connected nearly to the middle, three-nerved, cordate at the base, the nerves on the under surface, as well as the petioles, branches, and calyces, clothed with rufous villi. Shrubby climber. India, 1818. (G. C. 1881, xvi., p. 204.)

B. inermis (unarmed). *fl.* white; petals linear; racemes terminal, leafless, simple. *l.* ovate at the base, ferruginous beneath; leaflets oblong, acute, four-nerved, parallel, connected a little beyond the middle. *h.* 6ft. to 8ft. Mexico, 1810.

B. multinerva (many-nerved). *fl.* snow-white; petals linear. Legume 8in. to 12in. long. *l.* elliptic, rounded at the base, membranous, shining above, rather pilose beneath; nerves ferruginous; leaflets semi-ovate, obtuse, approximate, five-nerved; free. *h.* 20ft. Caracas, 1817.

B. natalensis (Natal).* *fl.* white, 1½in. across, opposite the leaves.

September. *l.* small, alternate, of two obliquely-oblong rounded leaflets. Natal, 1870. (B. M. 6086.)

B. petiolata (long-petioled). *fl.* white, 3in. long, in terminal clusters. Autumn. *l.* stalked, ovate-acuminate, five-nerved, glabrous. Columbia, 1852. SYN. *Casparia speciosa*. (B. M. 6277.)

B. pubescens (downy). *fl.* white, large, much crowded; petals obovate; peduncles three to four-flowered. *l.* rather cordate at the base, pubescent beneath and on the petioles; leaflets connected beyond the middle, oval, obtuse, four-nerved, nearly parallel. *h.* 4ft. to 6ft. Jamaica, 1823.

B. purpurea (purple). *fl.*, petals red, one of them streaked with white on the claw, lanceolate, acute. Legume linear, 1ft. long. *l.* cordate at the base, coriaceous, ultimately glabrous; leaflets connected much above the middle, broadly ovate, obtuse, four-nerved; free. *h.* 6ft. India, 1778.

B. racemosa (racemose). *fl.* white; petals obovate, obtuse; raceme somewhat corymbose. *l.* cordate at the base, clothed with silky villi beneath, as well as on the peduncles, petioles, branches, calyces, and petals; leaflets broadly ovate, obtuse, connected to the middle, five-

nerved. India, 1790. Shrubby climber. (B. F. S. 182.)

B. tomentosa (tomentose). *fl.*, petals pale yellow, with a red spot at the claw, obovate, obtuse; peduncles one to three-flowered. *l.* ovate or roundish at the base; under surface villous, as well as the petioles, branches, stipules, peduncles, bracts, and calyces; leaflets connected beyond the middle, oval, obtuse, three to four-nerved. *h.* 6ft. to 12ft. Ceylon, 1808.

B. variegata (variegated).* *fl.* red, marked with white, and yellow at the base, in loose terminal racemes; petals ovate, nearly sessile. June. *l.* cordate at the base, glabrous; leaflets broadly-ovate, obtuse, five-nerved, connected beyond the middle; free. *h.* 20ft. Malabar, 1690.

B. v. chinensis (Chinese). *fl.*, petals lilac, with one purple spot at the base of each, acute. *l.* rounded at the base. China.

BAWD-MONEY. *See* **Meum**.

BAY-TREE. *See* **Laurus nobilis**.

BEAK. Anything resembling the beak of a bird, as in *Aconitum*; the point which ends the helmet or upper sepal; hard, sharp points.

BEAM TREE. *See* **Pyrus Aria**.

BEAN BEETLE (*Bruchus granarius*). This insect, by

depositing its eggs in the seeds of Beans and Peas, causes a great amount of injury. It is about an eighth of an inch long, black, with brown hairs and white spots; tip of the tail prolonged, downy; front pair of legs reddish. The most effectual means of prevention is to destroy, when sowing, all seeds infested by it; and this may be detected by the skin of the seed being unusually transparent above the tunnel for exit. Imported seeds of Broad Beans are often much infested. "Dipping the Beans or Peas in boiling water for one minute is stated to kill the grub inside; but, as dipping for four minutes generally destroys the germinating power, the experiment is much too hazardous for general use", (Ormerod).

BEAN CAPER. *See* **Zygophyllum**.

BEAN FLY. *See* **Aphides** and **Black Fly.**

BEANS. There are three sections of these in cultivation for garden purposes, viz.: The Dwarf or French Bean; the Climbing, or Scarlet Runner; and the ordinary Broad Bean. *See also* **Faba** and **Phaseolus**.



Fig. 209. Broad Bean Plant in Flower (Faba vulgaris).

Soil. All Beans like a somewhat loamy soil, which, to secure good crops, must be deeply worked and heavily manured. The Kidney Beans, dwarf and tall, however, do not care for so heavy a soil as the Broad and Long-podded kinds; and this fact should be borne in mind when selecting their respective situations. The term Kidney is generally applied to both the Dwarf or French and the Climbing or Scarlet Runner.

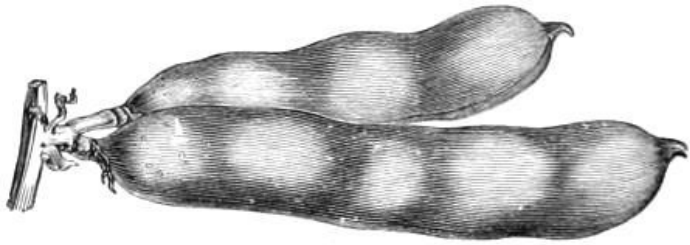


Fig. 210. Pods of Broad Bean.



Fig. 211. Broad Bean Seed.

Broad and Long-podded (*Faba vulgaris*). *Cultivation*: As early as possible in the autumn, deeply trench a piece of ground, and work in a heavy dressing of manure, leaving the surface of the soil in ridges, to become well aërated by winter frosts. Where desired, a piece of ground on a warm, protected border, can also be deeply dug in November, and a few rows of Mazagans sown to stand the winter. When up, draw a ridge of soil on either side the rows, and in frosty weather strew a few handfuls of bracken, or other light, dry litter, over them. Not much is, however, gained by this winter sowing. Early in January, level

the ridges with a fork, working the whole of the surface soil over, and towards the end of the month, make the first sowing, choosing Mazagan and other early varieties. Mark out two rows, 9in. asunder, leave a space of 30in., then another two rows, and so on throughout the piece sown. If preferred, they may be sown in single rows at intervals of 1½ft. The drills should be about 3in. deep, and the seed from 7in. to 9in. apart in the rows. Where the double-row system is adopted, arrange the seed for the plants to come alternately. In March, get in the main sowing of the Broad and later Long-podded kinds, in the manner already described; another sowing for late use may be made in April. When the plants are about 6in. high, earth up as recommended for those sown in the autumn. As soon as a good crop is set, pinch out the tops of the plants, to assist the maturation of the Beans, and prevent the attacks of the fly. Figs. 209, 210, and 211 are excellent representations of the flowering plant, pods, and seed of the Broad Bean.

Sorts. For early use: Early Mazagan, Long-pod, Marshall's Early Prolific, and Seville Long-pod. For late use: Carter's Mammoth Long-pod, and Broad Windsor (white variety). These are all distinct and good varieties.



Fig. 212. Fruiting Plant of Dwarf or French Bean (Phaseolus vulgaris).

Dwarf or French Kidney Beans (*Phaseolus vulgaris*). *Cultivation*: This class (see Fig. 212) also requires a rich and deeply trenched rather light soil. A very important point is to get the ground into a good condition, by frequently forking it over; and, as the seeds are not sown till the beginning of May, there is plenty of time for the work. The finer the soil is, and the more it is aërated, the better will it suit the crop. From the beginning of May till the end of June, at intervals, draw out drills about 2ft. apart, and 3in. deep, and in these place the Beans tolerably thick, as generally they are not all certain to grow. As soon as up, carefully thin them, and slightly earth up to prevent the wind blowing them about. They should not, however, be earthed higher than the seed leaves, or they will probably rot off in wet weather. Keep free from weeds, and maintain a sharp look out for

slugs. In dry weather, water occasionally, giving good drenchings, and not mere sprinklings, which do more harm than good. A good mulching of half-rotted manure is very beneficial, as it prevents evaporation to a great extent, besides affording some amount of nourishment to the plants. Great care must be taken to pick off the Beans as soon as large enough for use, or they will exhaust the plants. Where seeds are needed, a number of plants should be left for the purpose, and these should be some of the best, to prevent deterioration, or loss of the true variety.

Forcing. French Beans require more heat than can be obtained in either a frame or an ordinary greenhouse; and, although easy enough to grow in a structure suited to their requirements, yet, if such does not exist, they are almost sure to fail. A good heat, from 60deg. to 70deg., with abundance of moisture, is necessary for successful results. Plenty of light is also most essential. A position such as that of a cucumber house is generally a suitable one; but the plants must not be placed under the cucumbers. Successional sowings in pots or boxes must be made, from the end of August till March, to keep up a supply. For soil, use good maiden loam, with a little well-rotted manure added. Use 8in. pots, sowing five or six beans in each. The first sowing should be placed in a frame and kept well watered, bringing into heat in October; but the subsequent sowings should be placed directly in the house. Keep the soil moist, and the plants free from aphides and other insect pests, and give air at every favourable opportunity. The plants should be as near the light as possible, and kept from falling about by tying or placing small pieces of Birch wood round them. In dull weather, it will be found that the blooms will

not set so freely as when the sun shines brightly; therefore, every care should be taken to secure both heat and ventilation when sunshine prevails. When the pots get full of roots, and the plants are bearing fruit freely, a little liquid manure is of great assistance; at no time must the plants get dry enough to flag. Allow plenty of room for the full development of foliage, and maintain a minimum temperature of 60deg., with plenty of moisture.

Sorts. These are very numerous, among the best being Black Negro, Canadian Wonder, Canterbury, Fulmer's Forcing, Golden Dun, Newington Wonder, Osborn's Early Forcing, Sion House, and Sir Joseph Paxton.

RUNNERS OR CLIMBING KIDNEY BEANS (*Phaseolus multiflorus*). *Cultivation*: Being tall growers, these need a greater space than the Dwarf French varieties, and they also require support. Rich soil is indispensable for them, and liberal supplies of water on light soils and in dry weather. A good overhead syringing from time to time is also advantageous. Trench and heavily manure a piece of ground in autumn, leaving it in ridges for the winter. In March, level the ridges down, and well work the ground, to render it friable and in good condition. The plants being extremely tender, it is not safe to sow before the end of April or the first week in May. It is preferable to sow in rows, which should be from 6ft. to 12ft. apart, and crop the ground between with other vegetables. Earth up and stake them as soon as ready, to prevent injury from rough wind. A good plan, which may be adopted to obtain early produce, is to raise the seeds in boxes in a cold frame, getting them ready for planting out in the middle of May. Plant at the same distances, and treat afterwards as

recommended for those sown out of doors.

If preferred, they can be grown on the ground without stakes. Under this treatment, they must have their tops pinched off when about 18in. high, continuing this pinching from time to time as necessary. If this plan is adopted, the rows need only be 3ft. apart, the ground not being otherwise cropped. In dry seasons and on light soils, there is an advantage attached to this method, namely, that those on sticks are liable to injury from drought, while the foliage of those pinched back keeps the soil moist underneath.



Fig. 213. Runner or Climbing Kidney Bean (Phaseolus

MULTIFLORUS).

Runner Beans may also be planted to cover arches or fences, and in various places of a like description. See Fig. 213.

Sorts. Common Scarlet Runner, Champion, Painted Lady, and Giant White. The first two are those generally grown.

BEAN-TREE. *See* **Ceratonia Siliqua**.

BEARBERRY, and **BEAR'S GRAPE**. *See* **Arctostaphylos Uva-ursi**.

BEARD-TONGUE. *See* **Pentstemon**.

BEARS BREECH. *See* **Acanthus**.

BEAR'S FOOT. *See* **Helleborus fœtidus**.

BEATONIA. *See* **Tigridia**.

BEAUCARNEA (a commemorative name). ORD. *Liliaceæ*. A small genus of curious greenhouse plants, natives of Mexico. Leaves narrow, gracefully depending. Stems slender, and woody, with a peculiar swollen, somewhat napiform base. Mr. B. S. Williams recommends that these plants be potted in rich fibrous loam and sand, with ample drainage, and, during the growing season, liberally supplied with water. Propagated by cuttings, when obtainable; but chiefly by seeds, which have to be imported from their native country. Beaucarneas are principally grown for the beauty of their foliage, and are grotesque, graceful, and extremely curious in habit and form.

B. glauca (grey).* *l.* pendent, glaucous, 2ft. to 3ft. long. Stem slender, the swollen base becoming woody with age.

B. g. latifolia (broad-leaved) differs from the type only in its stouter and more robust stem and broader leaves.

B. longifolia (long-leaved).* *l.* 6ft. to 10ft. long, narrow, pendent, dark green, forming a beautiful vase-like centre. *h.* 10ft. Mexico, 1868. Very distinct. (G. C. 1877, vii., 493.)

B. recurvata (recurved-leaved).* *l.* very long, linear, gracefully pendulous, bright green. Mexico, about 1845. This is an excellent subject for open-air culture during the summer, as well as for the conservatory. SYN. *Pincenictitia tuberculata*. (G. C. 1870, 1445.)

B. r. rubra (red). *l.* red at base.

B. stricta (upright). *l.* 3ft. or more long, less than 1in. broad, very glaucous. Stem stout. Mexico, 1870.

BEAUFORTIA (commemorative of Mary, Duchess of Beaufort, a botanical patroness). Including *Schizopleura*. ORD. *Myrtaceæ*. Elegant free-flowering greenhouse Australian shrubs. Flowers scarlet; calyx with a turbinate tube; stamens in bundles opposite the petals. Leaves sessile, opposite or scattered. Beaufortias require a compost of peat, leaf soil, and loam, lightened, if necessary, by the addition of sand. Cuttings of half-ripened shoots root freely in sandy soil, under a glass, with very little heat.

B. decussata (decussate). *fl.* scarlet; bundles of stamens on very long

claws; filaments radiating. May. *l.* opposite, decussate, ovate, or oval, many-nerved. *h.* 3ft. to 10ft. New Holland, 1803. (B. M. 1733.)

B. purpurea (purple).* *fl.* purplish-red, in dense globular heads. *l.* three to five-nerved, erect or spreading, ovate-lanceolate to lanceolate-linear. New Holland.

B. sparsa (few-leaved). *fl.* bright scarlet. *l.* many-nerved, scattered, ovate-elliptical, obtuse. West Australia. SYN. *B. splendens*. (P. F. G. xiii., 145.)

B. splendens (splendid). Synonymous with *B. sparsa*.

BEAUMONTIA (in honour of Mrs. Beaumont, formerly of Bretton Hall, Yorkshire). ORD. *Apocynaceæ*. A very ornamental stove twiner, remarkable for its handsome flowers. It succeeds best when planted out in the borders of a temperate house, in rich lumpy loam and peat. Propagated by cuttings, placed in sand, with bottom heat.

B. grandiflora (large-flowered).* *fl.*, corolla large, white, greenish outside near the base, and dark throat, with a short tube, and a large campanulate five-lobed limb; corymbs axillary and terminal, many-flowered. June. *l.* opposite, broad, oblong-ovate, with a little point, tapering towards the base, smooth and shining above, but

rather downy beneath; young leaves and branches rusty. Chittagong and Sylhet, 1820. (B. M. 3213.)

BED. A term usually applied to pieces of ground laid out in gardens for sowing small seeds, or for the isolation and better protection of small collections of plants in the reserve ground. The oblong is the best shape for this purpose, about 4ft. or 5ft. wide, somewhat raised, and having a narrow path on each side, so that the workman may attend to the plants or seeds without having to tread on the bed. Any one part of a flower-garden design, cut out in grass, or otherwise formed, is also generally termed a Bed. When required to be planted for effect, as in this case, the Bed should be proportionate in size to the plants that are to be put in it, always planting the highest in the centre and gradually sloping, with other sizes, to the edges, which should be the lowest. Circular Beds are best with one centre plant; and oblong or other shapes should have the height of the centre plants carried nearly the whole length, not, however, placing them in too formal a manner.

BEDDING-IN. A method of seed-sowing, now almost obsolete, and chiefly employed in nurseries. "In this method, the ground being dug and formed by alleys into Beds, 4ft. or 5ft. wide, each alley being a spade's width or more between Bed and Bed, and the earth being drawn off the top of the Bed with a rake or spade, ½in. or 1in. deep into the alleys, the seed is then sown all over the surface of the Bed; which being done, the earth in the alleys is immediately cast over the Bed, again covering the seeds the same depth, and the surface is raked smooth" (Johnson). In the case of small seeds, a very light covering is needed, and that only of very fine soil.

BEDDING-OUT. The temporary placing out of doors of greenhouse and other tender plants during the summer months. It is considered by some to be the showiest, most expensive, and most unnatural of any style. The geometrical arrangement of gaudy colours is not at all times satisfactory, and under the most favourable conditions the design is rarely retained more than two or three months, say, from July to September. The method is, however, so extensively adopted as to demand due notice in this work. Bedding usually commences in May. An important consideration is the proper preparation of the soil for the reception of the plants. It will be found to materially assist the growth if the soil is well dug over a fortnight before the plants are put in. By this means, it will acquire a certain amount of solidity, a point of great importance with fibrous-rooted plants that are subject to injury from the fine roots not taking a firm hold of the soil. Having decided upon the arrangement of the plants, proceed to work with the planting. With round, oval, or, indeed, almost any shaped bed, begin in the centre and work towards the edge; in borders, commence at the back and finish with the front row. Plant with a trowel, disturbing the balls as little as possible, and when in the holes press the soil moderately firm. After the Bed is finished, give a good soaking of water to settle the soil at the roots. Manure for Flower-beds should always be perfectly rotten, such as that from a spent hotbed. When the plants are thoroughly established, water must only be given if they show signs of distress; and then a good soaking should be applied. A careful hoeing of the surface after planting will be most beneficial, leaving it smooth and tidy. A Dutch hoe will be the best to use. Injudicious use of manure and water will only cause a foliaceous growth. The

proper treatment of the various Bedding Plants will be found under their respective headings. For spring decoration, the Beds may be filled with Dutch bulbs, and spring-flowering annuals and perennials *ad infinitum*; or, after the plants are removed in autumn, the Beds may be filled with evergreens plunged in pots, such as Aucuba, Arbor vitæ, Euonymus, and various little Conifers, which have a bright appearance through the winter, and can be removed at any time. With the relative value, or advisability of adoption, of either or any system of gardening, it scarcely comes within the province of this work to deal. No hard-and-fast rules can be laid down as regards "style," and each individual may follow his own taste and inclination.

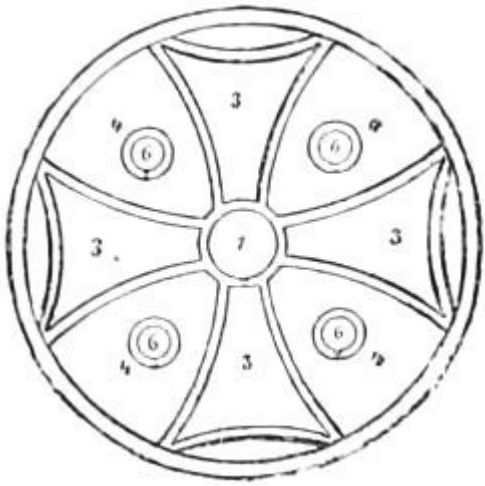


Fig. 214. Design for Carpet Bedding.

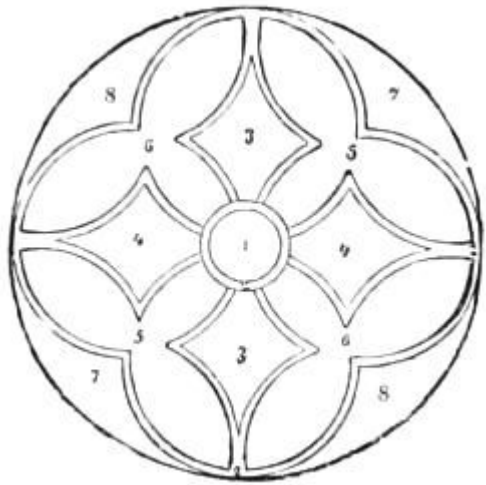


Fig. 215. Design for Carpet Bedding.

Carpet Bedding. This mode of gardening, although not so generally employed as it was some few years ago, has many admirers, and small plots, geometrically arranged in multi-coloured beds on lawns, are frequently seen. In our large public parks, the system is largely adopted, and evidently proves very gratifying to the multitudes who visit these places; but probably no system is more unnatural or expensive, as such a large number of plants are necessary in order to produce a desirable effect. The illustrations (Figs. 214 and 215) represent two designs for Carpet Beds. The numbers placed in the various compartments indicate the way the different colours should be arranged, repeats being marked by the same cypher. A very varied and large selection of plants can be used for Carpet Bedding, some of which are quite hardy, such as *Herniaria glabra* and *Veronica repens*, two of the best dwarf green plants; *Sempervivum californicum*, *Sedum lydium*, *S. glaucum*, *Antennaria tomentosa*, &c. These may be planted early in the season, with Golden Feather, and are

especially valuable, as they are generally employed to a great extent. Other plants, not quite so hardy, are *Mentha Pulegium gibraltarica* and *Echeveria secunda glauca*, both of which are extensively used; while the tenderest subjects are Alternantheras of various kinds, *Coleus Verschaffeltii* and *Mesembryanthemum cordifolium variegatum*. These latter should not be planted till the first or second week in June. As the plants are usually small, and require to be planted thickly, the work is best accomplished with the fingers, pressing the soil moderately firm. First of all, work out the design, and plant the leading lines; afterwards fill in the "panels."

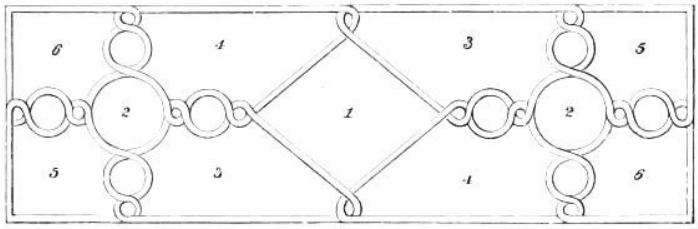


Fig. 216. Design for Bedding.

Sub-Tropical Bedding. This term is applied to the arrangement of tropical plants in Beds or groups outside for the summer months, and if discriminately adopted a very attractive and unique display may be made, depending greatly upon position, and mainly upon the material at command. If a sheltered and partially shady situation is enjoyed, a grand effect may be produced by the grouping of tree and other large ferns with palms, Cannas, Aralias, Dracænas, &c., avoiding, of course, formal arrangement, and yet, when finished, a symmetrical appearance should be produced. In more open positions, palms, Castor Oil Plants, Cannas, *Humea elegans*, Aralias, Phormiums, Wigandias, Nicotianas, &c., may be

employed, the result being, if properly arranged, most gratifying. Sub-Tropical Bedding should not be done till the middle or end of June, and the Beds should be well dug and freely manured for those that are to be planted out.

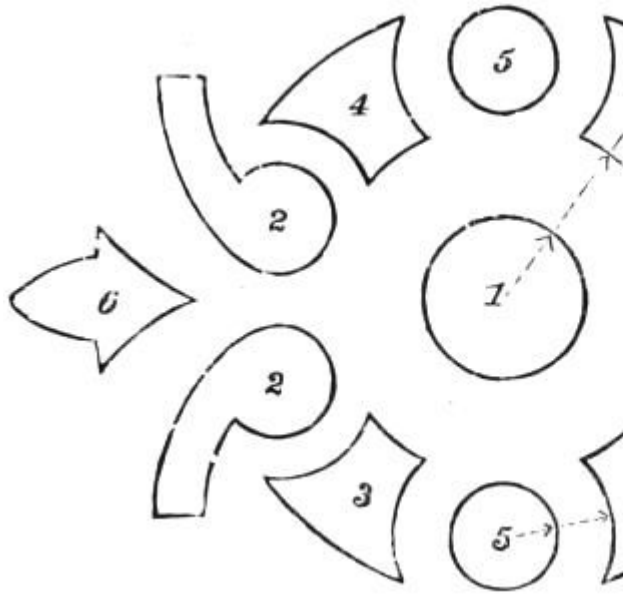


Fig 217. Design for Bedd

Fig. 216 represents a Border or long piece of ground, which may be either marked out permanently with Box edging, dwarf-growing silver or golden leaved plants, tiles, stones, or pebbles, and filled in with silver sand or bright-coloured stones or gravel; or the lines may be widened out into walks. The whole of the small circles not numbered are intended for specimen foliage and other plants, such as Fuchsias, Yuccas, Aloes, Cannas, Solanums, variegated or plain Reeds, Grasses, Maize (*Zea*), &c. No. 1, tall plants of *Echeveria metallica*, edged with *E. glauca*; 2, 2, yellow or orange Calceolaria; 3, 3, Mrs. Leavers

Pelargonium; 4, 4, Triomphe de Stella ditto; 5, 5, purple or blue Verbena; 6, 6, white ditto. The narrow border round the side may then be filled in with Golden-feather Pyrethrum, blue Lobelia, or *Alternanthera amabilis*. This same plan may also be treated in quite a different manner, according to the taste of those adopting it, or the stock of plants at command.

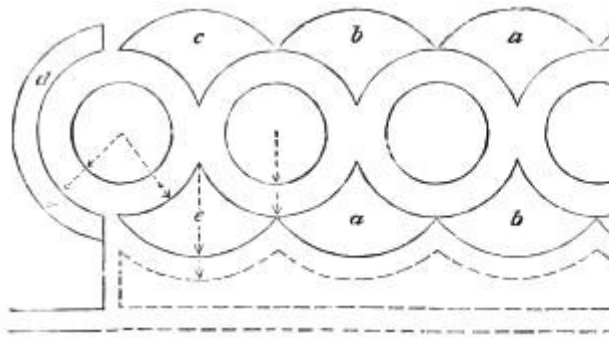


Fig. 218. Design for Bedding or

Fig. 217 illustrates a design admirably adapted for a rosery or small flower garden. Its only fault is the number of sharp angles at the corners of some of the Beds; but this can be counteracted by the predominance of curved lines. It is easily formed, and the effect is good if furnished in the following manner: The circle in the centre, 1, *Centaurea ragusina compacta*, edged with a double line of *Coleus Verschaffeltii*; the four figures 2, 2, 2, 2, scarlet Pelargoniums, such as Vesuvius, Bonfire, Triomphe de Stella, or others; 3, 3, Mrs. Pollock, golden-zoned Pelargoniums, edged with *Alternanthera amœna*; 4, 4, Lady Cullum, ditto, ditto, edged with ditto; 5, 5, *Lobelia speciosa*, Imperial Dwarf Ageratum, or Purple King Verbena; 6, 6, white Verbena or white Ivy-leaved Pelargonium.

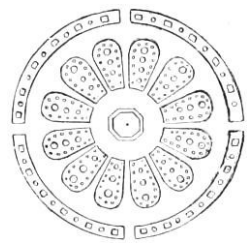


Fig. 219. Arrangement of Nursery for Rose Trees and

SHRUBS.

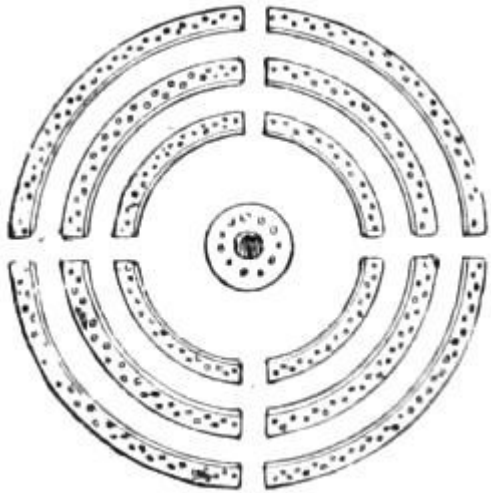
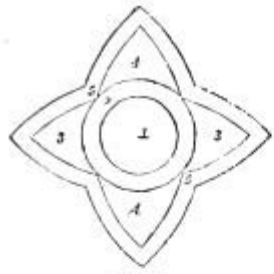


FIG. 220. ARRANGEMENT OF NURSERY FOR ROSE TREES AND SHRUBS.

The group of Beds illustrated in Fig. 218 is effective on grass or gravel. If on the latter, the lines should be defined with Box, Golden Thyme, Cerastium, or Santolinas. The design is pretty on level, but is still more effective on sloping ground; in the latter case, it should rise from the straight walk (dotted line). Thus each Bed may be seen to the best advantage, and the group may be extended to any length. The circular Beds should be planted with two distinct colours, such as good pink and scarlet Pelargoniums of similar habits of growth, placing the colours in alternate Beds. The Beds, *a*, *a*, *a*, Flower of Spring, or another silver-leaved Pelargonium; *b*, *b*, *b*, Purple King Verbena, or Imperial Dwarf Ageratum; *c*, *c*, White Perfection Verbena, and silver-leaved or white-flowered Ivy-leaved Pelargonium; *d*, *d*, *Alternanthera magnifica*; *e*, *e*, Blue Lobelia. The long

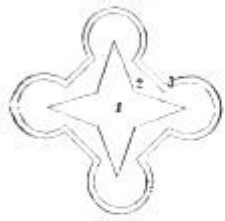
border, *Alternanthera paronychioides*, edged with *Antennaria tomentosa*; or *Iresine Lindenii*, edged with Pyrethrum, Golden Fleece or Crystal Palace Gem Pelargonium. The two sides may also be planted alike. The colours are reversed above to produce a greater variety and a more striking effect. This design is also well adapted for Carpet Bedding.



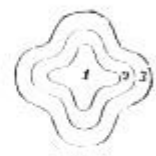
Bed A.



Bed B.



Bed C.



Bed D.



Bed E.



Bed F.
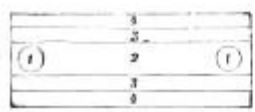




Fig. 221. Bedding-out Designs.

Nursery Bed. This is merely a reserve ground or nursery for a large stock of plants of various sorts, such as Roses, &c. One of the first requirements is an easy access to the individual plants, and with the least possible waste of space. This may be obtained by arranging the Beds in regular geometric figures, as shown in Figs. 219 and 220, and, by exercising a little care and taste, the whole can be so contrived as to present an ornamental appearance.

We are indebted to Messrs. Cannell and Sons for the diagrams of Bedding-out designs shown at Fig. 221, which may be made very effective:

Bed A. This Bed may be planted with the following: Summer-flowering: 1, Gain's Yellow Calceolaria or Ageratum Lady Jane; 2, Geranium Vesuvius or another scarlet; 3 and 4, Viola Blue-bell or Purple King Verbena; 5, edged with *Gnaphalium lanatum*, or *Antennaria tomentosa*, white foliaged plants. Summer Foliage: 1, *Coleus Verschaffeltii*; 2, *Centaurea ragusina compacta*; 3 and 4, Mrs. Pollock Geranium; 5, band of any of the Echeverias, or *Kleinia repens*.

Bed B. Plants mentioned for A will do for this.

Bed C. This is really intended for a Carpet Bed. 1, *Alternanthera amabilis*, with a narrow line of *amœna* for the edge; 2, *Mentha*, or *Herniaria glabra*; 3, band of *Mesembryanthemum cordifolium variegatum*. Flowering: 1, Any kind of Scarlet Geranium; 2, Golden-leaved ditto; 3, Blue Lobelia (edge). Spring: 1, White Arabis; 2, *Myosotis dissitiflora*; 3, Golden Feather.

Bed D. Summer: 1, Pink Geranium; 2, *Iresine Lindenii*; 3, Golden Feather. Carpet: 1, *Alternanthera versicolor grandis*; 2, *Mesembryanthemum cordifolium variegatum*;

3, *Alternanthera magnifica*, edged with *Sempervivum montanum*.

Bed E. 1, Scarlet Geranium; 2, Pink ditto; 3, *Lobelia speciosa*; or, 1, *Alternanthera amœna*; 2, *Mesembryanthemum cordifolium variegatum*; 3, *Echeveria secunda glauca*.

Bed F. 1, *Dracœna*, *Chamœpeuce*, or any other graceful foliage plant for the centre; 2 and 4, *Alternanthera amabilis*, the divided lines, 6, being filled with Mentha or Echeverias; 3 and 5, *Alternanthera amœna*; and the outer edge, 7, with *Sempervivum californicum*. This bed would look well if planted with any of the above-mentioned spring flowers. Spring: Bed might be raised to a mound, and lined out with hardy Sedums, or Sempervivums, placing a larger growing one in the centre; and 2, 3, 4, and 5 divisions may be filled with any spring-flowering dwarf-growing plants.

Bed G. 1, Small plant of Yucca; 2, *Coleus Verschaffeltii*; 3, *Alyssum variegatum*; 4, *Lobelia pumila magnifica*.

Bed H. 1, Golden Feather; Mesembryanthemum; 3, Mentha; 4, *Alternanthera amabilis*; or 1, *Coleus Verschaffeltii*; 2, *Centaurea ragusina*; 3, Calceolaria Golden Gem; 4, Ageratum Lady Jane.

BEDDING PLANTS. This term applies to many half-hardy subjects which are planted out in beds for summer display, such as Ageratums, Calceolarias, Geraniums, Heliotropes, Lobelias, Verbenas, &c., all of which will be treated under their respective headings. They are mostly soft-wooded plants and are easily cultivated with proper means, in spring and autumn.

BEDFORDIA (named in honour of a former Duke of

Bedford). ORD. *Compositæ*. Greenhouse evergreen shrubs, allied to *Cacalia*. They thrive in a mixture of sand, peat, loam, and brick rubbish, in equal proportions. Propagated by cuttings, which should be dried a little before inserting them in rough, sandy soil.

> **B. salicina** (willow-like). *fl.-heads* yellow, axillary and solitary, or few together. April. *l.* alternate, lanceolate, linear, glossy above, covered with white tomentum underneath. *h.* 3ft. Victoria and Tasmania, 1820. SYN. *Cacalia salicina*. (B. R. 923.)

BEDSTRAW. *See* **Galium**.

BEECH. *See* **Fagus**.

BEES. *See* **Honey Bees**, **Humble Bees**, and **Wasps**.

BEET (*Beta*, which *see*). The present varieties of Beetroot are the offspring of *Beta vulgaris*, a plant of biennial duration, and a native of the sea coasts of Southern Europe. It was cultivated in this country about 1656, but was probably long previously introduced by the ancient Romans. Beetroot is largely used as salad, more extensively on the Continent than with us, also pickled; medium sized, deeply coloured roots being the chief desideratum. Some varieties are largely grown for their highly-coloured foliage, being planted in bedding-out designs, and generally proving extremely effective.

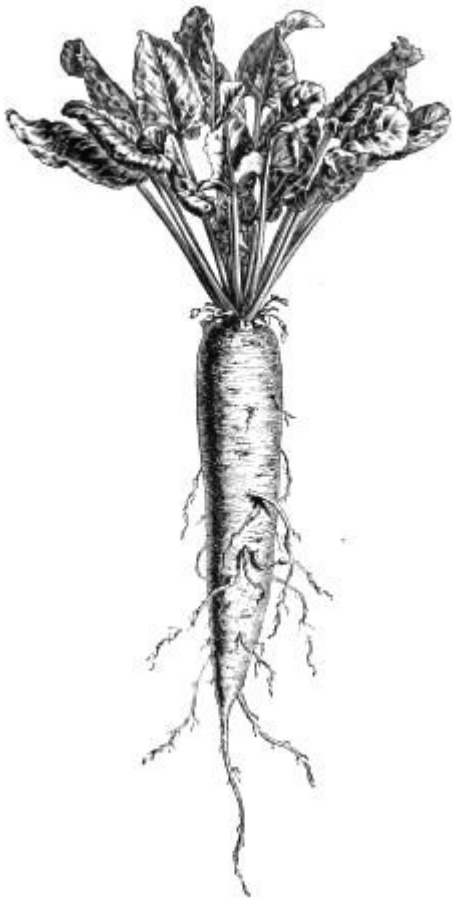


Fig. 222. Long Yellow Beetroot.

Cultivation: For obtaining the best results, an open situation should be chosen, free from the shade of trees. The ground should be light and sandy, and, if possible, that which has been previously manured for some other crop, French beans, for instance. Trench the soil to a depth of 2ft. in the autumn, and ridge it up for the winter. As soon as dry enough to allow of working in spring, dig over the whole bed with a steel digging fork, and break the soil tolerably fine.

Sow any time from the last week in April to the end of May. Prepare the drills about a foot or 15in. apart, and from 1in. to 2in. deep. The seeds grow quicker if steeped in water previous to sowing, afterwards allowing them to get dry enough to separate from each other. Sow thinly, and fill in the drills with a rake. As soon as the plants are up, hoe between the rows, and keep free from weeds. In a fortnight or three weeks after this hoeing, if the weather has been favourable, the plants will be large enough for thinning. Thin out to about 9in. apart, and carefully fill up, in dull weather, any blanks that may occur. Transplanting is, however, not generally a very satisfactory method. Carefully lift the roots in autumn, before frost comes, and wring off the leaves about an inch from the crowns. Place the roots in a cool shed or house, and allow the soil on them to get quite dry, when they may be stored for winter use in dry sand, or soil, in a shed free from frost. It is preferable to keep the crowns free from soil, to prevent decay from the ends of the leaves left on them. If this be carefully done, the roots will keep till the next season's early crop is ready. In all processes connected with the growing, storing, or cooking of this vegetable, the greatest care must be taken to avoid bruising or otherwise injuring the roots, as deficiency of colour would be the result, especially in the case of the red-fleshed kinds, in some cases rendering them valueless for table use. Seed Saving: When lifting the crop in autumn, select as many of the best formed and coloured roots as required, and store them separately from the rest. In April, plant them in a spot by themselves, where there is no danger of impregnation from other varieties, and in due time good seed will ripen. If good foliaged varieties are required, the best should be selected

when growing in the summer, and either be marked by some means, or have the inferior ones removed from them.

Sorts. These are somewhat numerous—almost every seedsman having a so-called "improved strain." Nutting's Dwarf Red, Chelsea, Pine Apple, Dell's Crimson and Red Castelnaudary, are the best of the crimson or red-fleshed kinds. The Egyptian Turnip-rooted is a distinct variety, with flesh of a good colour, and fine flavour; excellent for summer salads. Betterave de Bretagne is a Continental variety; the roots grow to a good size, with a distinct outer skin of a dark colour; flesh rich purple. The best of the yellow-fleshed kinds are Small Yellow and Long Yellow (see Fig. 222); but these are not grown nearly so much as the deep-coloured section; in fact, they are almost useless for garden purposes.



Fig. 223. White Leaf Beetroot.

Beetroot for Bedding Purposes: In this case, where the foliage is the main object, the seed may be sown in a reserve bed, and the plants transferred to their

positions in the flower garden. If, however, a line is required in a ribbon or other border, the best plan is to sow there, and thin out the plants to equal distances. Dell's Crimson is one of the best varieties for this purpose, being very compact and of a good dark colour.

Varieties of the Leaf Beet (*Beta Cicla*), and Sea or Perennial Beet (*Beta maritima*), are sometimes, but very seldom, cultivated for the use of the leafstalks and leaves, the roots being hard and unfit for cooking purposes. They are at the best but substitutes for other vegetables—namely, the midrib for Sea-kale and the leaves for Spinach. If desired, seeds may be sown in the way described for Beetroot, in April for using in autumn and winter, and in August for spring use, plants of the latter sowing being protected in severe weather. The best sorts are Red-stalked, Yellow-stalked, and White (see Fig. 223) or Silver Leaf.

BEET CARRION BEETLE (*Silpha opaca*). This destructive insect is frequently found in dead animals, but often its grub almost destroys the leaves of Beet and Mangold Wurzel crops. The grubs, which are black and shining, when full grown are from ⅓in. to ½in. long; the three segments next the head are rounded at the sides, but the other segments are sharp, and the tail segment has a sharp spine on each side. "When full-fed, the grubs bury themselves, and form cells at the depth of 3in. or 4in. below the surface of the earth, in which they turn to pupæ, and from these the Beetle has been seen to come up in about the space of a fortnight or three weeks" (Ormerod). The Beetles are flattish, and about five lines long, brown-black, with a tawny down; eyes large and oval; horns club-shaped; body somewhat

oval; wing-cases very flat, turned up at the outer edge, each case having three sharp ridges running along it; tip of abdomen dull red. Any manures or methods of cultivation that would stimulate growth in the plants, so as to permit renovation of injuries, would be found useful. If farmyard manure were applied to the soil intended for Beet *in the autumn* instead of in spring, it would lessen the risk of attack to the Beets.

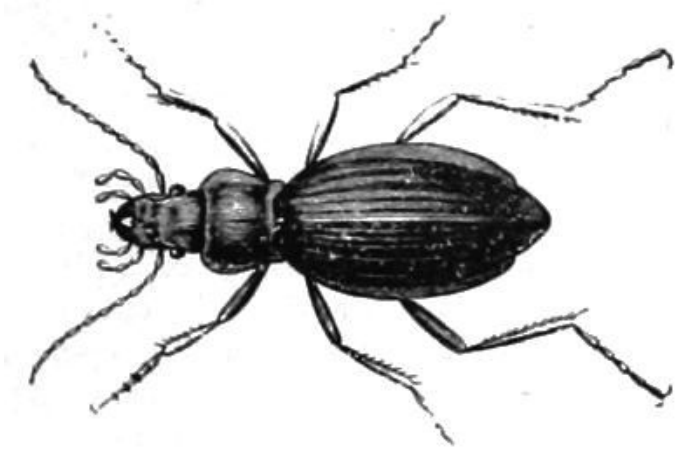


Fig. 224. Common Garden Beetle.



FIG. 225. DEVIL'S COACH HORSE.

BEETLES (*Coleoptera*). Beetles form one of the most extensive orders of insects, there being upwards of 3000 known British species. They vary much in appearance, but a Beetle is readily recognised by its front wings, or elytra; these form a tough horny sheath or case, which lies over the real wings, and protects them when the insect is not flying. Sometimes, the elytra are very short (see Fig. 225); the mouth is fitted with jaws for cutting. The metamorphosis is complete, *i.e.*, the larva or grub is very unlike either the quiescent pupa or the perfect insect. The period that elapses before Beetles arrive at their perfect state varies from a few weeks to two or three years, but is usually rather longer than in Butterflies or Bees. Various Beetles attack growing plants and roots. Thus, *Otiorhynchus sulcatus* and *O. picipes* attack Vines, Roses, and other plants, gnawing off the bark. Some species of Beetles attack Mushrooms, while others bore into the wood of old trees, or eat leaves (*e.g.* Turnip Fly), or burrow in the leaves, or form galls on roots (Cabbage-gall Weevil). Of some kinds, the beetles are hurtful; of others, the larvæ. Many kinds, however, are beneficial, such, for instance, as the common Ground Beetle (*Carabus*, Fig. 224), and the Devil's Coach Horse (*Ocypus olens*, Fig. 225). These live upon other insects and snails. One kind of Beetle—the Ladybird (see Figs. 226 and 227)—is very beneficial in a garden, as it preys upon the aphides, or plant lice. For instructions in dealing with the noxious kinds, *see* **Asparagus Beetle**, **Bean Beetle**, **Beet Carrion Beetle**, **Click Beetle**, **Cockchafer**, **Lily Beetle**, **Rosechafer**, and **Turnip Fly**.





FIG. 226. SEVEN-SPOTTED LADYBIRD. FIG. 227. GRUB OF LADYBIRD. (Enlarged).

BEET or **MANGOLD FLY** (*Anthomyia betæ*). The maggots of this fly do considerable damage by feeding on the pulp of the Beet or Mangold leaves. The eggs are small, white, and oval, and are laid in small patches beneath the leaves; the maggots are about ⅓in. long, legless, cylindrical, and yellowish-white. As it is of such recent appearance in this country, specifics for its eradication are by no means numerous; but, according to Miss Ormerod, "the best treatment appears to be to nip it in the bud, where such treatment is possible, by destroying the infested plants, but generally by all means of good cultivation, or by special applications of artificial manure, to ensure a hearty growth, which may run the plants on past the power of average attacks to weaken the leafage to a serious extent."

BEFARIA (named in honour of Bejar, a Spanish botanist). ORD. *Ericareæ*. SYN. *Bejaria*. An elegant genus of greenhouse evergreen shrubs, closely allied to *Rhododendron*. Flowers bracteate; corolla very deeply seven-cleft, spreading. Leaves racemose or corymbose, crowded, quite entire, coriaceous. They thrive in a compost of peat and loam. Propagated by cuttings, made of the young wood, and placed in sandy soil, in gentle heat.

B. æstuans (glowing).* *fl.* purple; corymbs terminal, simple; peduncles, pedicels, rachi, calyces, and branchlets clothed with clammy

glandular hairs. *l.* elliptic, rather glabrous above, but downy and glaucous beneath, while young clothed with rusty tomentum. Plant much branched; branchlets sub-verticillate. *h.* 10ft. to 15ft. Peru, 1846. SYN. *Acunna oblonga*. (G. C. 1848, 119.)

B. cinnamomea (cinnamon-coloured). *fl.* purple; panicles close, terminal; peduncles woolly, hispid. *l.* slightly downy above, rusty tomentose beneath. Branches downy, hispid. *h.* 4ft. Peru, 1847.

B. coarctata (close-headed). *fl.* purple; corymbs terminal, simple; peduncles, pedicels, rachi, and calyces clothed with rusty tomentum. *l.* oblong, glabrous, glaucous beneath. Shrub much branched. *h.* 4ft. to 5ft. Peru, 1847. (G. C. 1848, 175.)

B. glauca (glaucous).* *fl.* flesh-coloured; racemes terminal and axillary; pedicels somewhat fastigiate. June. *l.* oblong, obtuse, glaucous beneath. Shrub much branched; branchlets angular. *h.* 3ft. to 6ft. South America, 1826.

B. ledifolia (Ledum-leaved).* *fl.* purple; racemes terminal; peduncles, pedicels, rachi, branchlets, and calyces clothed with clammy glandular hairs. *l.* oblong, somewhat mucronate, with revolute edges,

glaucous beneath, glandular. Shrub much branched; branches purplish. *h.* 3ft. to 4ft. South America, 1847. (F. d. S. 3, 195.)

B. racemosa (racemed). *fl.* purple, disposed in racemose terminal panicles. July. *l.* ovate-lanceolate, glabrous; branchlets smooth or hispid. *h.* 3ft. to 5ft. Georgia, 1810.

BEGONIA (named after M. Begon, a French patron of botany). ORD. *Begoniaceæ*. A large genus of succulent herbs or undershrubs (a few climbers), in many of which the stem is reduced to a tuberous rhizome, whilst some are distinctly tuberous. Flowers usually showy and large, white, rose, scarlet, or yellow, unisexual; perianth segments petaloid, four to five divisions, rarely two. Stamens numerous, filaments free or united at the base. Ovary inferior, styles two to four, free, sometimes connate, stigmas brandied or twisted. Fruit capsular, rarely succulent, often winged. Seeds numerous, minute. Leaves alternate, more or less unequal-sided, entire, or lobed, or toothed. Flower-stalks axillary, cymose. Distribution: Species about 350, in all tropical moist countries, especially South America and India; not known in Australia. Cultivated species (exclusive of garden hybrids and varieties) about 150. A large number of genera, or what were considered as such are now merged in Begonia—viz., *Barya*, *Baryandra*, *Casparya*, *Pritzelia*, &c. The rich colours and beautiful form of the flowers of Begonias, their prettily-marked foliage, and free-growing, free-blooming nature, have long marked them out as favourite garden plants. Within the last twenty years a new race, characterised by a tuberous root-stock, annual

herbaceous stem, and large handsome flowers, has been introduced from the Andes of South America, from which, by means of careful cross-fertilisation and selection, a large number of beautiful and almost hardy kinds have been raised. The size, substance, and rich colours of the flowers of the majority of the plants of this race of Begonias are witness to what may be done by skilful cultivation and careful cross-breeding among plants. In the same way the large-leaved, stemless section, of which *B. Rex* may be taken as the type and principal progenitor, have been improved both in the size and the coloration of their foliage, and countless forms are now in cultivation, both as garden plants and for the decoration of rooms, &c. The propagation of Begonias may be accomplished by means of seeds, which are freely produced by almost all the cultivated kinds, by cuttings, by division of the rhizomes, and—in the case of the large-leaved kinds—by leaf-cuttings. For the first of these methods it is necessary that the seeds should be well ripened before they are gathered, and kept dry until sown. Where it is desired to increase any particular kind of garden origin, seeds are useless, none of the hybrid or seedling forms perpetuating themselves through their seeds, although equally beautiful sorts may be raised from them. The characters of all true species are, however, reproduced in their seedlings. For the successful raising of Begonia seeds it is necessary to sow them on pans or pots of well-drained, light, sandy soil, which should be well watered before the seeds are sown. The seeds should not be covered with soil, or they will fail to germinate. Over the pans a pane of glass should be placed, and they should then be stood in warm house or a frame where a temperature of about 65deg. can be

maintained, and shaded from sunshine. As soon as the plantlets are large enough to be safely manipulated, they should be pricked off into pans of light leaf-mould soil, in which they may remain until large enough to be placed singly in pots. Cuttings: These strike freely if planted in small pots, in sand and leaf mould, and placed on a bottom heat of 70deg. Where large quantities are required, a bed of cocoa nut-fibre in a stove or propagating frame may be used, and in this the cuttings may be planted and remain until well rooted. Leaf cuttings succeed best when laid on sand or cocoa-nut fibre, and shaded from bright sunlight. In preparing the leaves, old, well-matured ones should be selected, and incisions made with a sharp knife across the principal nerves on the underside. They should then be placed on the sand or fibre and held down by means of a few pieces of crock. Under this treatment, bulbils will form on the lower ends of the nerves of each section of the leaf, and these, when large enough, may be removed from the bed and potted. With the exception of *B. Evansiana* (*discolor*), an almost hardy species from North China, all the shrubby species require a warm or intermediate house for their cultivation, although during the summer months a frame or sheltered bed answers for most of them, provided they are removed into their warm winter quarters on the approach of cold weather. Some of the species, such as *B. Dregei*, *B. semperflorens*, *B. nitida*, *B. fuchsioides*, *B. Lindleyana*, *B. Richardsiana*, along with the hybrids *Ascotensis*, *Knowsleyana*, *Weltoniensis*, and *Ingramii*, are grown in pots out of doors all the summer, and under liberal treatment they form large handsome specimens, which are of great value as flowering plants for the conservatory in winter. The tuberous-rooted herbaceous kinds

should be started in heat in February, and, when vigorous growth has commenced, be gradually hardened off, for use either as bedding plants or as pot specimens for flowering in the greenhouse. A mixture of loam and leaf mould with a little sand and rotten cow-dung is suitable for the cultivation of these plants in pots. Liberal supplies of water should be given during the growing season. As the growth decays, water should be withheld until finally the tubers may be shaken out of the soil and placed in dry sand or cocoa-nut fibre, in a house or shed where a temperature above freezing can be maintained. *B. gracilis* and its varieties, *diversifolia* and *Martiana*, are beautiful greenhouse plants, which thrive well if treated as advised for the other tuberous-rooted kinds, with the addition of a few more degrees of heat.

The *Rex* section requires a light rich soil, plenty of moisture, and a shaded position in a warm greenhouse. These kinds are often employed with good effect for clothing peat-covered walls in ferneries, or as an undergrowth in large tropical houses. Large specimens have been grown under the stage in a warm house, the shade and moisture of such a position being exactly what they best delight in.

B. socotrana, an interesting species from the island of Socotra, is somewhat singular in its requirements. The stem is herbaceous and annual, and about its base a cluster of bulbils are formed, from every one of which a plant will be developed the following year. The growing season for this species is from September to March, after which it goes to rest for the whole summer. A tropical temperature and all the light possible, are essential to the well-doing of

this plant.

It is interesting to note the apparent impossibility to cross any of the shrubby Begonias with the distinctly tuberous-rooted species; and even the species of the shrubby section, whose stems are semi-tuberous, have hitherto refused to commingle with the South American tuberous kinds, of which *B. Veitchii*, *B. rosæflora*, and *B. boliviensis* may be said to be typical. The infusion of the blood of these large, handsome-flowered kinds into the tall, shrubby species, would almost certainly result in the production of a race of splendid winter-flowering greenhouse plants, and it is therefore in every way desirable that no pains should be spared to break through the obstacle to the union of the two races.

Explanation of contractions: T, tuberous-rooted; S, shrubby.

B. acerifolia (Acer-leaved). S. A tall-growing, thick, succulent-stemmed species, with green, lobed, serrated foliage, and large branching cymes of small white flowers; sepals of male flowers hairy; styles three, two-horned. Capsule triangular, with one of the angles prolonged into an obtuse wing. Spring. Quito, 1829.

B. acuminata (taper-pointed-leaved). S. A low shrubby species, having semi-cordate, oblong, pointed leaves, with toothed margins, and the nerves on the under side and the petiole pilose. *fl.* white, in cymes, nearly 1in. across. Capsule wings, two short, the third

½in. long. Spring. Jamaica, 1798. (B. M. 4025.)

B. acutifolia (acute-leaved). S. A smooth-stemmed, semi-erect species, 3ft. to 4ft. high, with cordate-oblong leaves, both sides and petiole glabrous, the margins denticulate. *fl.* in cymes, white and red, about 1in. in diameter. Capsule winged, one wing twice as long as the others. Spring. Jamaica, 1816. SYN. *B. purpurea*.

B. acutiloba (acute-lobed).* A species with thick fleshy rhizomes, and palmate cordate leaves which are divided into five to seven lobes, with toothed margins and pointed apices, under side thinly covered with brown hairs. Flower-stalk tall, hairy, surmounted by a branching head of rather large white flowers. Summer. Mexico.

B. albo-coccinea (white and red).* Stemless, with a thick root-stock. *l.* broadly ovate, peltate, entire, 3in. to 4in. long; petiole 3in. to 6in., pubescent. Flower-scape 6in. to 9in. long. *fl.* in dense cluster, bright rose on the outside, white within. Capsule regularly triangular, with short wings. Summer. India, 1844. SYN. *B. Grahamiana*. (B. M. 4172.)

B. alchemilloides (Alchemilla-like). Stem fleshy, creeping. *l.* rotundate, with toothed, undulate, ciliated

margins and short stalks. Flower-stem slender, few-flowered. *fl.* small, rose-coloured. Summer. Brazil.

B. amabilis (lovely).* Stem creeping, fleshy, short. *l.* ovate, crenulate, acuminate, about 6in. long, tomentose, dark green, blotched with white, under side purple-red. Flower-stalk 9in. long. *fl.* rose or white, in clustering cymes. Capsule irregular. Summer. Assam, 1859. The foliage sometimes comes wholly green, but, under good treatment, it is handsomely variegated.

B. amœna (pleasing).* Rhizome tuberous. Stem none, or very short. *l.* 3in. by 2in.; leafstalk 3in. Flower-stem 6in. long, few-flowered. *fl.* medium sized, pale rose. Capsule wings small, nearly equal. Summer. North India, 1878. SYN. *B. erosa*.

B. ampla (large). S. Stem 1ft. to 2ft. high, very stout, woody. *l.* long-stalked, 8in. to 10in. in diameter, broadly ovate, cordate, pointed, when young densely covered with rusty stellate down. *fl.* on short petioles, rose-coloured, 2in. wide. Fruit a succulent berry, small. Summer. Guinea.

B. aptera (wingless). Stem herbaceous. *l.* heart-shaped, pointed, shining green. *fl.* in short axillary cymes, white, small. Capsule four-

angled. Spring. Celebes, 1878.

B. arborescens (tree-like). S. A large growing species, sometimes forming a bush 8ft. to 10ft. in height. *l.* pale green, ear-shaped, 6in. long. *fl.* in large cymose clusters, white, small. Summer. Brazil.

B. argyrostigma (silvery-spotted). Synonymous with *B. maculata*.

B. Arnottiana (Arnott's). Synonymous with *B. cordifolia*.

B. asplenifolia (Asplenium-leaved). S. A slender-stemmed, beautifully cut-leaved species, the foliage of which is pinnatisect, giving the plant the appearance of a Thalictrum rather than a Begonia. *fl.* very small, white. Guinea.

B. assamica (Assam). Stem short, fleshy. *fl.* pinkish flesh-colour. *l.* oblique ovate, olive-green, marbled with silvery blotches above, and of a pale purplish-pink beneath; petioles pale green, softly hairy. Assam, 1883.

B. attenuata (attenuated). Synonymous with *B. herbacea*.

B. aucubæfolia (Aucuba-leaved). Synonymous with *B. incarnata*.

B. auriformis (ear-formed). Synonymous with *B. incana*.

B. barbata (bearded). S. Stem short,

hairy. *l.* toothed, oval-shaped, pointed, hispid beneath, 4in. long. *fl.* medium-sized, white or pink; flower-stalk hairy. Capsule equal-winged. Summer. India.

B. Berkeleyi (Berkeley's).* T. A garden hybrid, with thick, fleshy stems, and long ear-shaped foliage. *fl.* in erect panicles, rose-coloured. A useful winter-flowering kind.

B. bipetala (two-petaled). Synonymous with *B. dipetala*.

B. biserrata (doubly-serrated). S. Stem erect, branched, 2ft. to 3ft. high. *l.* 6in. long, 2in. to 3in. wide, deeply lobed, toothed, pale green. *fl.* in loose cymes, drooping, rose-coloured, 1½in. wide, serrated edges. Capsule pilose, two short and one long wings. Summer. Guatemala, 1847. (B. M. 4746.)

B. boliviensis (Bolivian).* T. Stem herbaceous, succulent, 2ft. high, branching. *l.* lanceolate, pointed, serrate, 3in. to 5in. long. *fl.* in drooping panicles, large, scarlet, males twice as large as females. Capsule three-winged. Summer. Bolivia, 1857. (B. M. 5657.)

B. Bowringiana (Bowring's). Synonymous with *B. laciniata*. (B. M. 5657.)

B. braziliana (Brazilian). S. Stem erect, tall, succulent. *l.* oblique,

ovate, toothed, slightly pubescent; principal nerves brownish; stalk hairy. *fl.* white or rose, small, in short, few-flowered cymes. Capsule wing ½in. long. Summer. Brazil.

B. Bruantii (Bruant's).* B. A garden hybrid between *B. Schmidti* and *B. semperflorens*. *l.* green, with a brownish tint. *fl.* white or rose, in erect panicles. Summer, 1883. Used as a bedding plant in summer.

B. bulbifera (bulb-bearing). Most likely a form of *B. gracilis*.

B. caffra (Kaffrarian). A variety of *B. Dregei*.

B. carolineæfolia (Carolinea-leaved). S. Stem erect, thick, fleshy. *l.* palmate, curiously divided into six to eight long ovate segments, each 6in. long. *fl.* in a dichotomous cyme, on long stalk, rose-coloured, small. Capsule small, wings one longer than others. Winter. Mexico, 1876. A singular-leaved species. (R. G. 1-25.)

B. Cathcartii (Cathcart's). S. Caulescent. *l.* heart-shaped, acute, glabrous; stalks of flowers and leaves hairy; flowers and fruit as in *B. barbata*. Summer. India. SYN. *B. nemophila*. (C. H. P. 13.)

B. Chelsoni (Chelsea).* T. A garden hybrid between *B. Sedeni* and *B. boliviensis*. Stem fleshy, 2ft. high. *l.* oblique, lance-shaped, irregularly

lobed. *fl.* large, orange-red, drooping. Summer, 1874.

B. cinnabarina (vermilion).* S. Stem erect, short, herbaceous. *l.* 2in. to 4in. long, oblique, toothed; peduncles 6in. long, few-flowered. *fl.* (male), medium, red; female flowers very small. Summer. Capsule irregularly-winged. Bolivia, 1848. (B. M. 4483.)

B. cinnabarina (vermilion). A variety of *B. fuchsioides*.

B. Clarkii (Clarke's).* T. Stem purplish, fleshy, stout. *l.* oblique-cordate, serrate. *fl.* in pendulous racemes, abundant, large, bright red, very handsome, nearly related to *B. Veitchii*. Summer. Peru and Bolivia, 1867. (B. M. 5675.)

B. coccinea (red).* S. Habit suffruticose. Stem sub-erect, 1ft. to 2ft. high, thick at the base. *l.* ovate-oblong, pointed; margins undulate and toothed. *fl.* in pendulous racemes, medium-sized; flowers and peduncles red. Capsule nearly regular; wings short. Summer. Brazil, 1842. (B. M. 3990.)

B. conchæfolia (shell-leaved). Stem creeping, rhizomatous, thick. *l.* peltate, ovate, 3in. to 5in. long, edges almost entire; under side, along with leaf and flower-stalks, covered with ferruginous hairs;

scape 9in. long, erect, surmounted by corymb of small whitish fragrant flowers. Capsule wings, one long, two short. Autumn and winter. South America, 1852. SYNS. *B. scutellata*, *B. Warscewiczii*. (R. B. 246.)

B. corallina (coral-flowered). S. Stem woody, branching, sub-erect, brownish when matured. *l.* ovate-oblong, pointed, undulate, smooth, dull green, under side purple. *fl.* in long pendent racemes, numerous, medium-sized, bright coral-red. Summer. Brazil (?), 1875. A rare species, and one of the handsomest of the shrubby kinds, most likely closely related to *B. maculata*.

B. cordifolia (heart-shaped). T. Stemless; root-stock fleshy. *l.* cordate, orbicular, toothed, 3in. wide, pilose above, pubescent below; flower-scape 6in. long, dichotomous. *fl.* numerous, medium-sized. Capsule with three narrow wings. Winter. Ceylon and India. SYN. *B. Arnottiana*.

B. coriacea (leathery).* T. Stem 6in. high, herbaceous. *l.* reniform, 5in. wide by 3in. long, smooth above, pilose below. *fl.* rose-coloured, large, in twos or threes on the end of an erect scape, 8in. to 10in. long. Wings of capsule short, red. Summer. Bolivia.

B. coriacea (leathery). Synonymous

with *B. peltata*.

B. crassicaulis (thick-stemmed). Stem short, thick, articulated, succulent. *l.* palmate; segments acuminate, toothed, under side clothed with rusty down. *fl.* in many-flowered cymes, dipetalous, white or rose-coloured, medium-sized. Capsule wings unequal. Near to *B. heracleifolia*. Spring. Guatemala, 1841. (B. R. 28, 44.)

B. crinita (hairy).* S. Stem 1ft. high, fleshy, bright red, more or less hairy. *l.* ovate-cordate; margins toothed, dark green; petiole red and hairy, like the stems. *fl.* in lax, branching cymes, rose-coloured, 1½in. in diameter. Fruit three-winged, one long and acute, two short and rounded. Spring. Bolivia, 1870. (B. M. 5897.)

B. cucullata (hooded). A variety of *B. semperflorens*.

B. dædalea (adorned).* Stem short, thick, succulent. *l.* large, green, thickly covered with a close network of russet-brown, scarlet when young; edges pilose. *fl.* white and rose, in loose panicles. Mexico, 1860. A handsome foliaged plant. (I. H. 1861, 269.)

B. Daveauana. *See* **Pellionia Daveauana**.

B. Davisii (Davis's).* T. stemless, *l.*

springing directly from root-stock, ovate-cordate, shining green, slightly hairy, underside red; petiole short, fleshy. Flower-scapes, pedicels, and flowers bright red; scape 4in. high, bearing half a dozen flowers in umbel. Capsule three-winged, one long, two very short. Summer. Peru, 1876. A handsome tuberous-rooted species, dwarf. See Fig. 228, for which we are indebted to Messrs. Veitch and Sons. (B. M. 6252.)

B. dichotoma (branching). S. Stem tall, stout, fleshy. *l.* 5in. long by 4in. wide, lobed, dull green. *fl.* white, on long axillary scapes, numerous. Winter. 1860.

B. Digswelliana (Digswell's). Stem short, semi-decumbent, large, green; margins red. *fl.* on long, erect scapes, pale pink, small, numerous. Useful for winter flowering purposes. A garden hybrid. (F. M. 236.)

B. dipetala (two-petaled). Stems springing from a fleshy root-stock, erect, 18in. high, brown. *l.* half heart-shaped; margins toothed, upper surface thickly spotted with white, under side red. *fl.* in loose axillary cymes, two-petaled, large, pink. Capsule equal-winged. Spring. India, 1828. A handsome species. (B. M. 2849.) SYN. *B. bipetala*.

B. discolor (two-coloured). Synonymous with *B. Evansiana*.

B. diversifolia (diverse-leaved). A variety of *B. gracilis*.

B. Dregii (Drege's).* Rootstock fleshy. Stems succulent; annual, 1ft. high. *l.* oblique, thin, green, slightly spotted with grey, reddish on the under side. *fl.* white, about 1in. across, in axillary cymes. Capsule three-winged, one much longer than the other two, and acute-pointed. Summer. Cape, 1840. SYNS. *B. caffra*, *B. reniformis*.

B. echinosepala (spiny-sepaled).* Stem green, succulent, 18in. high. *l.* small, obliquely-oblong, serrulate. *fl.* on axillary peduncles, white, with curiously papillose sepals. Summer. Brazil, 1872. (R. G. 707.)

B. elliptica (elliptic). Synonymous with *B. scandens*.

B. erecta multiflora (erect, many-flowered). *fl.* bright reddish-pink, produced for several months, but especially during the winter. *l.* oblique, deep bronze coloured, very conspicuous. A decidedly handsome and very useful garden variety.

B. erosa (bitten). Synonymous with *B. amœna*.

B. Evansiana (Evans's).* T. Stem herbaceous, branching, smooth, 2ft. high. *l.* oblique, ovate-acute, sub-cordate, lobed; margins denticulate,

green above, under side and petioles deep red; flower-stalks branching, axillary. *fl.* numerous, flesh-coloured, large. Capsule wings blunt-pointed, one longer than the others. Summer. Java, China, Japan, 1812. A handsome species, and almost hardy. SYNS. *B. discolor*, *B. grandis*. (B. M. 1473.)

B. eximia (excellent).* A hybrid, raised from *B. rubro-venia* and *B. Thwaitesii*. Stem short, succulent. *l.* bronzy-purple, tinged with red. A handsome foliage plant. (I. H. 1860, 233.)

B. falcifolia (sickle-leaved).* S. Stem 1ft. to 2ft. high, erect, branching. *l.* 6in. long, 1½in. wide, curved, tapering to a narrow point; margins toothed, upper surface green, more or less spotted with white, under side deep red. *fl.* on short axillary peduncles, drooping, dipetalous, bright red. Wings of capsule equal, ½in. wide. Summer. Peru, 1868. A pretty flowering plant. (B. M. 5707.)



Fig. 228. Begonia Davisii.

B. ferruginea (rust-coloured). S. Stem woody, erect, smooth branching, covered with ferruginous hairs. *l.* oblique, ovate-acute, acuminate, lobed; margins toothed. *fl.* in branching cymes, large red. Capsule unequal-winged. Summer. Bogota. Syn. *B. magnifica*.

B. Fischeri (Fischer's). Similar to *B. falcifolia*, except that the foliage is unspotted, and the flowers are white and small. Brazil, 1835. (B. M. 3532.)

B. foliosa (leafy).* S. Stem slender, branching, fleshy. *l.* small, ovate-oblong, dark green, numerous,

distichous on stems. *fl.* small, numerous, white, tinged with pink. Summer. New Grenada, 1868. Useful for growing hanging baskets. SYN. *B. microphylla*. (Ref. B. 222.)

B. frigida (frigid). S. Stem 1ft. high, smooth, green, succulent. *l.* cordate, acuminate, lobed, serrated, slightly pilose; upper side coppery-green, beneath deep rose-red, especially upon the veins. *fl.* small, white, in erect branching cymes. Capsule wings two long, one short. Summer. Country unknown, 1860. (B. M. 5160.)

B. Frœbeli (Frœbel's).* T. Stemless. *l.* numerous, cordate, acuminate, green, covered with purplish-velvety hairs. *fl.* in tall, lax, drooping, branching cymes, brilliant scarlet, large. Winter. Ecuador, 1872. A beautiful flowering plant, useful for conservatory work in winter. (Garden, pl. 96.)

B. fuchsioides (Fuchsia-like).* S. Stem tall, drooping, herbaceous, smooth, green, tinged with red. *l.* copious, distichous, 1½in. long, oblong-ovate, slightly falcate, serrated, smooth; margins tinged with red. *fl.* in branching pendulous panicles, numerous, rich, deep scarlet. Capsule wings two very short and one long. Summer. New Grenada, 1846. A handsome

greenhouse plant, useful for covering pillars, &c. SYN. *B. miniata*. (B. M. 4281.)

B. f. miniata (vermilion). *l.* smaller than in type. *fl.* cinnabar red. (F. d. S. 8, 787.)

B. gemmipara (bud-bearing). S. Stem 1ft. high, from a tuberous root-stock, succulent, *l.* ovate-acuminate, cordate, lobed, smooth above, pilose below. *fl.* medium-sized, white, or with rose stripes, on pendulous, axillary peduncles; sometimes the peduncles bear, instead of flowers, quadrangular cups, which are closely packed with oblong viviparous bulbils. Summer. Himalaya. (C. H. P. 14.)

B. geranifolia (Geranium-leaved).* Rootstock tuberous. Stem 1ft. high, erect, angular, succulent, green, with a purplish tinge, branched dichotomously. *l.* cordate, cut into unequal serrated lobes, green; margins red, whole plant perfectly smooth; peduncles terminal, bearing two to three flowers, which are inclined, drooping while in bud; outer petals orbicular, red, the two inner obovate, waved white. Summer. Lima, 1833. (B. M. 3387.)

B. geranioides (Geranium-like).* T. Rootstock fleshy. Stemless. *l.* radical, somewhat reniform, lobed, serrated; surface scabrid, deep green;

leafstalks red, hairy. *fl.* white, in lax, drooping panicle. Summer. Natal, 1866. A pretty, though delicate, species. (B. M. 5583.)

B. glandulosa (glandular-leaved).* Stem a stout rhizome, scaly. Leafstalks thick, terete, erect, hairy, 9in. high. *l.* 6in. broad, fleshy, cordate, lobed, green; veins dark. *fl.* on tall, dark, erect scapes, numerous, greenish-white. Capsule wings, one very large, blunt. Costa Rica, 1854. SYNS. *B. hernandiæfolia*, *B. nigro-venia*. (B. M. 5256.)



Fig. 229. Begonia heracleifolia.

B. gogoensis (Gogoan).* *l.* peltate, ovate-orbicular, oblique, acute when young, with a bronzy metallic hue, ultimately changing to a deep

velvety-green, intersected by the paler midribs and veins; the under surface deep red. *fl.* pale rose, in a lax panicle. Gogo, in Sumatra, 1881. A very handsome, ornamental-foliaged species.

B. gracilis (slender).* T. Stem erect, unbranched, very succulent, *l.* thinly scattered along stems, half heart-shaped, slightly hairy, lobed, denticulate-ciliate. *fl.* on short axillary peduncles; umbel of few male and female flowers, two larger petals serrate, colour pink. Capsule winged, green. Mexico, 1829. In axils of leaves between stipules a cluster of bulbils are borne; these may be gathered and sown as seeds. This and its varieties, *annulata*, *diversifolia*, *Martiana*, &c., are beautiful summer flowering greenhouse Begonias, requiring a sandy peat soil and shade. When well grown, they are exceedingly ornamental. (B. M. 2966.)

B. Grahamiana (Graham's). Synonymous with *B. albo-coccinea*.

B. grandiflora (large-flowered). Synonymous with *B. octopetala*.

B. grandis (great). A variety of *B. Rex*.

B. grandis (great). Synonymous with *B. Evansiana*.

B. grandis (great). Synonymous

with *B. vitifolia*.

B. Griffithii (Griffith's). Stemless; rhizome subterraneous. *l.* large, obliquely-cordate; margin crenate, hairy; surface granulated, colour a dark green; margin purple, zoned with grey, under side green, centre and margin deep purple. *fl.* on cymes, large, white internally, outside tinged with blush, slightly pilose. Capsule tubercled, one wing large, projecting. Winter. India, 1856. (B. M. 4984.)

B. Hasskarlii (Hasskarl's). Synonymous with *B. peltata*.

B. heracleifolia (cow-parsnip leaved). Rootstock thick, fleshy. *l.* radical, on long pilose stalks, palmate, large, bronzy green; margins toothed, hairy. Flower-stalks long, stout, erect, hairy, many-flowered. *fl.* rose-coloured. Capsule wings nearly equal. Spring. Mexico, 1831. This and the following varieties are handsome both in foliage and flowers. SYNS. *B. jatrophæfolia*, *B. punctata*, *B. radiata*. See Fig. 229. (B. M. 3444.)

B. h. longipila (long-haired). *l.* greyish in middle; outer portions dark bronzy, blotched with green. Whole plant covered with long, stiff, fleshy hairs. *fl.* as in the type.

B. h. nigricans (dark). This differs

from the type in having foliage of a blackish tint all round the margins of the lobes, and the petals of the flowers nearly white. (B. M. 4983.)

B. h. punctata (dotted). *l.* green, reddish near margin. *fl.* rose-colour, with deep red spots on the outside.

B. herbacea (herbaceous).* Rhizome creeping. *l.* oblong-acute, lanceolate, toothed, ciliated. Flower-stalks shorter than leaves; male flowers in a cymose head, white, small; female flowers solitary, on very short stalks. Spring. Brazil, 1873. A small species, very succulent, with the appearance of a primrose when not in flower. SYN. *B. attenuata*. (G. C. 1873, 679.)

B. hernandiæfolia (Hernandia-leaved). Synonymous with *B. glandulosa*. (Seemann.)

B. hernandiæfolia (Hernandia-leaved). Synonymous with *B. nelumbiifolia*. (Gardens.)

B. hernandiæfolia (Hernandia-leaved). Synonymous with *B. peltata*. (B. M. 4676.)

B. hirsuta (hairy). Synonymous with *B. humilis*.

B. Hookeri (Hooker's). A variety of *B. semperflorens*.

B. Hookeriana (Hooker's). S. Stem woody, 5ft. to 6ft. high, branching,

covered with minute rusty tomentum. *l.* ovate, unequal sided, blunt, 8in. long, tomentose, like the stem. *fl.* in axillary cymes, small, white. Spring. Brazil, 1850.

B. humilis (dwarf).* Stem erect, fleshy, hairy. *l.* semicordate-oblong, acuminate, ciliate-serrate, hairy above, smooth beneath. *fl.* few, in cymes, small, white. Capsule unequal winged. Summer. Trinidad, 1788. Annual. SYN. *B. hirsuta*.

B. humilis (dwarf). Synonymous with *B. suaveolens*. (B. R. 294.)

B. hybrida floribunda (many-flowered).* A very beautiful summer blooming hybrid between *B. fuchsioides* and *B. multiflora*. *fl.* bright rose, medium sized, produced in abundance. Summer. One of the best.

B. hydrocotylifolia (Penny-wort-leaved).* Stem succulent, short, creeping. *l.* rotundate cordate, almost equal-sided; petiole short. Whole plant hairy. Flower-stalks 1ft. high, pilose. *fl.* in cymose head, medium-sized, dipetalous, rose-coloured, as also are pedicels and stalk. Capsule wings equal-sized, large. Summer. Mexico, 1841. (B. M. 3968.)

B. h. asarifolia (Asarum-leaved). Leaves and flowers smaller than in

the type, the latter white. Mexico.

B. imperialis (imperial).* Stem rhizomatous, short, thick. *l.* large, broad, ovate-acute, cordate, rugose, hairy, dark olive-green; nerves banded with greyish-green colour. *fl.* in cymes, white, medium-sized. *fr.* unequal winged. Mexico, 1861. A handsome foliage species. (I. H. 1860, 262.)

B. i. smaragdina (emerald-like). *l.* shining emerald green.

B. incana (hoary). Stem erect, fleshy, tomentose. *l.* leathery, peltate, oblong-acute, sub-angular, whitish beneath. Flower-stalks long. *fl.* in small downy panicles, white. Winter. Mexico, 1840. SYN. *B. auriformis*.

B. i. auriformis (ear-like). *l.* divided at the base, not peltate. *fl.* glabrous.

B. incarnata (fleshy).* S. Stem erect, fleshy, 2ft. high, smooth; nodes swollen, reddish, spotted. *l.* on short, smooth petioles, unequally cordate, acuminate, sinuately-serrate, green. *fl.* large, rose-coloured, handsome; peduncles terminal, nodding. Capsule with unequal wings, the largest acute. Winter. Mexico, 1822. SYNS. *B. aucubæfolia*, *B. insignis*, *B. Lindleyana*. (B. M. 2900.)

B. i. maculosa (spotted). *l.* spotted

with white.

B. i. metallica (metallic-leaved). *l.* with a bronzy-purple metallic lustre.

B. i. papillosa (papillose). Foliage margined with bright rose; upper surface covered with little papillæ. (B. M. 2846.)

B. i. purpurea (purple-leaved). Foliage deep bronzy-purple.

B. Ingramii (Ingram's).* A garden hybrid, raised at Frogmore in 1849, from *B. fuchsioides* and *B. nitida*. It combines the characters of the two parents. A useful winter-flowering plant; may be grown out of doors in summer. (G. M. B., p. 153.)

B. insignis (remarkable). Synonymous with *B. incarnata*.

B. involucrata (involucrate). S. Stem erect, tall, angular, covered with a reddish tomentum. *l.* oblique, ovate-acuminate, cordate; margins toothed and ciliate. *fl.* enclosed in a wrapper, or involucre, when young; peduncles graceful, bearing umbel of white, largish flowers. Capsule wings unequal, the largest falcate. Winter. Central America.

B. jatrophæfolia (Jatropha-leaved). Synonymous with *B. heracleifolia*.

B. Josephi (Joseph's). Stemless. *l.* radical, on petioles 6in. to 10in.

long, ovate-acuminate, three-lobed, or orbicular, with numerous acute lobes, slightly pubescent; scape 1ft., branched. *fl.* small, rose-coloured. Capsule wings unequal; upper margins horizontal. Summer. Himalaya.

B. Kunthiana (Kunth's).* S. Stem erect, smooth, slender, purple-brown. *l.* on short petioles, lance-shaped, acuminate, regularly serrated, smooth, dark green above, bright crimson below. *fl.* axillary, on short nodding peduncles, white, large, handsome. Summer. Venezuela, 1862. A pretty species. (B. M. 5284.)

B. laciniata (cut-leaved).* Rhizome thick, fleshy. Stem short, thick, jointed, reddish, woolly. *l.* large, 6in. to 10in. long, 4in. to 6in. broad, unequally cordate; margins irregularly cut, serrated; upper side green, under dull, rufous. *fl.* on short axillary peduncles, large, white, tinted with rose. Capsule wings, one very long, others short. Spring. Nepaul to Birma, South China, 1858. SYN. *B. Bowringiana*. (B. M. 5182.)

B. Leopoldi (Leopold's). A hybrid from *B. Griffithii* and *B. splendida*, with large variegated foliage. 1858.

B. Lindleyana (Lindley's).* S. Stem erect, fleshy, covered with ferruginous hairs. *l.* on long petioles,

peltate, ovate, acute, 5in. to 6in. long, 3in. to 4in. wide, irregularly lobed, toothed, green above, tomentose below. *fl.* on branching peduncles, medium sized, white. Winter. Guatemala.

B. Lindleyana (Lindley's). A garden synonym of *B. incarnata*. (Gardens.)

B. longipes (long-stalked). S. Stem 3ft. or more high, stout, succulent, furrowed, covered with glands. *l.* large, rotundate-cordate; margin irregular, serrated, both sides green, pubescent when young. *fl.* numerous, small, white; peduncle 1ft. long, branched. Winter. Colombia, 1829. (B. M. 3001.)

B. longipila (long-haired). A variety of *B. heracleifolia*.

B. lucida (shining). Synonymous with *B. scandens*.

B. Lynchiana (Lynch's). S. Stem erect, tall, succulent, smooth. *l.* fleshy, 10in. long, oblique, ovate-cordate, crenulate, green, smooth. *fl.* axillary, in drooping cymes, numerous, large, deep reddish-crimson. Winter. Mexico, 1880. One of the finest of the tall-growing winter-flowering species. When well managed, the flower-heads are almost a foot in diameter. SYN. *B. Roezlii*, of gardens. (B. M. 6758.)



FIG. 230. BEGONIA MACULATA, showing Habit, Section of Capsule, and Flower.

B. maculata (spotted).* S. A woody shrub. Stems branching, smooth. *l.* oblique, ovate-oblong, leathery, slightly undulate; margins entire, under side bright crimson, above green, with numerous large round blotches of silvery white. *fl.* in drooping panicles, coral-like, handsome. Capsule with one long, narrow wing. Summer. Brazil, 1821. (B. R. 666.) There are numerous varieties of this species, some with leaves almost green, others with the markings more striking than in the type; in the flowers they differ also, ranging from white to coral-red. The beautiful *B. corallina* is probably a variety of this. SYN. *B. argyrostigma.*

See Fig. 230.

B. magnifica (magnificent).* S. Stem erect, fleshy, smooth. *l.* ovate, unequal sided, toothed. *fl.* in terminal, cymose panicles, rosy-carmine, 1½in. long. New Grenada, 1870. (R. H. 1870, 271.)

B. magnifica (magnificent). Synonymous with *B. ferruginea*.

B. malabarica (Malabar).* Stem thick, succulent, 2ft. high, branching. *l.* numerous, cordate, acute, unequal-sided, crenate or serrate, hairy above and sometimes below, or altogether glabrous, spotted white. *fl.* rose-coloured; peduncles axillary, short, few-flowered. Capsule wings equal, joined above and below. Summer. Malabar and Ceylon, 1828. *B. dipetala* is made a variety of this, by Sir Joseph Hooker, in "Flora of British India." (L. B. C. 1730.)



Fig. 231. Begonia manicata.

B. manicata (tunicated).* Stem fleshy, twisted, short. *l.* oblique, ovate-acute, cordate, dentate-ciliate, smooth on both sides, shining green nerves on under side, with fleshy, scale-like hairs. *fl.* pink, dipetalous, in branching cymes; upper portion of stalk scaly. Capsule wings nearly equal. Winter. Mexico, 1842. See Fig. 231.

B. Manni (Mann's). S. Stem succulent, 2ft. to 3ft. high, branched, green; branchlets, young parts,

petioles, and leaf-nerves clothed with rusty, furfuraceous pubescence. *l.* petioled, 5in. long, 2in. wide, lanceolate, cordate, acuminate, toothed. *fl.* numerous, rose-red, in axillary cymes; peduncle 1in. long. Capsule linear, densely tomentose. Winter. Fernando Po, 1862. (B. M. 5434.)

B. marmorea (spotted). A variety of *B. xanthina*.

B. Martiana (Martin's). A variety of *B. gracilis*.

B. maxima (large).* Rhizome thick, hairy, creeping. *l.* large, oblique, orbicular-ovate, cordate, shortly acuminate; margins denticulate ciliate; petiole long, pilose. *fl.* in branching cymes; sepals orbicular, pilose on the outside, white. Summer. Mexico, 1853.

B. megaphylla (large-leaved).* Stem short, thick, fleshy. *l.* large, palmate, cordate; lobes numerous, pointed; margins hairy, under side slightly pilose; nerves with scaly hairs. *fl.* in diffuse cymes, small, white; peduncles pilose. Capsule wings wide. Winter. Mexico.

B. metallica (metallic). A variety of *B. incarnata*.

B. Meyeri (Meyer's). S. Stem erect, stout, woody when mature. *l.* large, broadly and obliquely ovate, fleshy,

pale green; margin sinuate, under side tinged with rose; both petiole and blade covered with short hairs. *fl.* on long axillary peduncles, in large paniculate heads, white. Capsule wings equal. Summer. Brazil, 1844. (B. M. 4100.)

B. microphylla (small-leaved). Synonymous with *B. foliosa*.

B. microptera (small-winged). Stem 1ft. high, terete, green, pubescent, as in the rest of the plant. Branches few. *l.* sub-distichous, 4in. to 6in. long, ovate-lanceolate, acuminate, serrated, dark green; petiole short; stipules as long as petiole. *fl.* in terminal panicles, medium-sized, white, tinted rose. Capsule long, triangular, two angles wingless, the other with a narrow wing. Winter. Borneo, 1856. (B. M. 4974.)

B. miniata (vermilion). A variety of *B. fuchsioides*.

B. monoptera (single-winged).* Stem erect, 1ft. to 2ft. high, rounded, swollen at the joints, dull red, papillose and downy. Radical leaves on long red stalks, large, reniform, truncate at the base; caulescent leaves smaller, on short petioles, angled, crenate, dark green above, red below, and minutely papillose. *fl.* on an elongated terminal raceme, white. Capsule three-angled, two wingless, the other

with a long pointed wing. Summer. Brazil, 1826. A distinct and pretty species. (B. M. 3564.)

B. Moritziana (Moritz's). Synonymous with *B. scandens*.

B. natalensis (Natal).* T. Rootstock thick, fleshy. Stem 1½ft. high, succulent, thick at the base, articulate, branched, smooth. *l.* unequal, semicordate, acuminate, lobed, toothed, spotted with white. *fl.* on axillary cymose peduncles, pale rose. *fr.* three-winged, two large, one small. Winter. Natal, 1855. (B. M. 4841.)

B. nelumbiifolia (Nelumbium-leaved).* Rhizome thick, fleshy, creeping. *l.* on long hairy petioles; blade 12in. to 18in. long, 8in. to 12in. wide, peltate, hairy on under side; scape 1ft. to 2ft. high. *fl.* in cymose head, numerous, small, white or rose coloured. Winter. Mexico. A noble-foliaged plant. SYN. *B. hernandiæfolia*.

B. nemophila. Synonymous with *B. Cathcartii*.

B. nigro-venia (black-veined). Synonymous with *B. glandulosa*.

B. nitida (shining).* S. Stem 4ft. to 5ft. high, erect, branched, woody when aged, smooth, shining. *l.* large, glossy, green on both sides, obliquely ovate, acute, crenated at

margin. *fl.* in terminal and axillary panicles, numerous, large, deep rose, handsome. Capsule three-winged, one much larger than others. Jamaica, 1777. One of the best winter, and almost a perpetual, flowering species. SYNS. *B. obliqua*, *B. pulchra*, *B. purpurea*. (B. M. 4046.)

B. obliqua (oblique). Synonymous with *B. nitida*.

B. octopetala (eight-petaled).* T. Stemless. *l.* on long succulent downy petioles, 1½ft. or more in length, cordate, 6in. long, deeply lobed and serrated at the margin, bright green; scape as long as petioles, rounded, downy. *fl.* in corymbs, greenish-white, males with eight petals, females generally fewer. Capsule three-angled, two wings almost suppressed, the other 1in. long; apex blunt, toothed. Autumn. Peru, 1835. SYN. *B. grandiflora*. (B. M. 3559.)

B. odorata (sweet-scented). Synonymous with *B. suaveolens*.

B. opuliflora (Guelder-rose-flowered).* S. Stem 1ft. high, branching, smooth. *l.* ovate oblong-acuminate, toothed, smooth above, hairy below. *fl.* white, in compact umbels, on erect scapes. Spring. New Grenada, 1854.

B. Ottoniana (Otton's). A hybrid from *B. conchæfolia* and *B. coriacea*.

(R. G. 1859, p. 15.)

B. papillosa (papillose). A variety of *B. incarnata*.

B. Pearcei (Pearce's).* T. Stem 1ft. high, succulent, branching. *l.* lance-shaped, cordate, pointed, toothed, glabrous above, tomentose beneath, and pale red. *fl.* in loose axillary panicles, large, bright yellow. Summer. Bolivia, 1865. Interesting because of its being one of the progenitors of the handsome race of garden tuberous Begonias.

B. peltata (shield-like). Stem short, tomentose; leaves 6in. by 4in., peltate, ovate, densely pilose. *fl.* in branching cyme, small, white; peduncle 6in. to 9in., pilose. Brazil, 1815. Interesting because of its distinctly peltate foliage and silvery appearance of whole plant. SYNS. *B. coriacea*, *B. Hasskarlii*, *B. hernandiæfolia*, *B. peltifolia*.

B. peltifolia (peltate-leaved). Synonymous with *B. peltata*.

B. phyllomaniaca (proliferous-stemmed). S. Stem thick, fleshy, rather twisted, green, hairy, clothed, when old, with small viviparous buds bearing small leaves, by which means the plant may be multiplied. *l.* ovate, acuminate, cordate, sinuately lobed, ciliate, smooth above and below. *fl.* in axillary

cymes, drooping, pale rose. Capsule with one large wing. Winter. Guatemala, 1861. (B. M. 5254.)

B. picta (ornamented).* T. Stem generally smooth, succulent, 6in. to 12in. high. *l.* ovate acuminate, nearly equally cordate, serrated, hairy above and on the nerves below, sometimes variegated. *fl.* pale rose, large, handsome; peduncle hairy, erect, short, few-flowered. Autumn. Himalaya, 1870. (S. E. B. 101.)

B. platanifolia (plane-leaved).* S. Stem 5ft. to 6ft. high, erect, robust, smooth, green; joints annulated. *l.* 8in. to 10in. in diameter, reniform, lobed, hispid on both sides, dark green; lobes acute, toothed, ciliated. *fl.* in axillary, dichotomous cymes, large, white, tinted rose, handsome. Summer. Brazil, 1834. (B. M. 3591.)



Fig. 232. Begonia polypetala.

B. polypetala (many-petaled). Stem about 1ft. high, covered with a soft whitish tomentum. *l.* ovate-acute, toothed, pubescent above, and densely tomentose below. *fl.*, petals nine or ten, of a fine red colour, smooth, external ones ovate-oblong, pointed; internal ones somewhat shorter and narrower; sepals two,

ovate-elliptic. Capsule tomentose, three-winged, with one wing larger, ascendent. Winter. Andes of Peru, 1878. See Fig. 232. (Garden, Dec. 14, 1878.)

B. prestoniensis (Preston).* A garden hybrid between *B. cinnabarina* and *B. nitida*. *l.* green, lobed, glabrous. *fl.* brilliant orange-red, in drooping axillary cymes, very fragrant. Autumn and winter. 1867. (G. M. B. 3, 149.)

B. prismatocarpa (prism-fruited).* Stems small, creeping, hairy; branchlets ascending. *l.* long, petioled, also hairy, obliquely cordate, ovate, three to five-lobed; lobes pointed, serrated; peduncles axillary, longer than foliage, bearing a small umbel of two to four dipetalous orange and yellow flowers, one female in each umbel. Capsule four-angled, scarcely winged. Summer. Tropical West Africa, 1861. The smallest of cultivated Begonias, and especially interesting because of its four-angled fruit. It forms a pretty cushion of bright shining green foliage, thickly studded with its brightly coloured flowers. Requires a stove temperature and a stony soil. (B. M. 5307.)

B. pruinata (frosted).* Stem short, thick, fleshy, smooth. *l.* large,

peltate, ovate, angular-sinuate, minutely-toothed; surface smooth, glaucous; margins pilose, on stout, fleshy petioles. *fl.* in large dense dichotomous, or small cymes, white. Winter. Central America, 1870. (R. B. 247.)

B. pulchra (fair). Synonymous with *B. nitida*.

B. punctata (dotted). A variety of *B. heracleifolia*.

B. purpurea (purple). Synonymous with *B. acutifolia*.

B. purpurea (purple). Synonymous with *B. nitida*.

B. Putzeysiana (Putzeys'). S. Stem erect, branching, smooth. *l.* oblong-lanceolate, acute, toothed, glabrous, under side spotted with white. *fl.* in copious small corymbs, white and rose, small. Capsule small, with rather large obtuse wings. Winter. Venezuela, 1871.

B. radiata (rayed). Synonymous with *B. heracleifolia*.

B. ramentacea (scaly).* S. Stem erect, branching, brown, scaly, as also are the leafstalks and peduncles. *l.* ovate, reniform, oblique; margins slightly angulate, recurved, under side red, scaly; peduncles branching. *fl.* drooping, pink and white, pretty. Capsule, when ripe, a bright scarlet;

wings large. Spring. Brazil, 1839. (P. M. B. 12-73).

B. reniformis (kidney-formed). Synonymous with *B. Dregei*. (Gardens.)

B. reniformis (kidney-formed). Synonymous with *B. vitifolia*. (Hook.)



Fig. 233. Begonia Rex.

B. Rex (Royal).* Stemless; rhizome fleshy, creeping, subterraneous. Leafstalk round, red, setose. *l.* 8in. to 12in. long, 6in. to 8in. broad, ovate, oblique, sides unequal, cordate, villose; margins toothed, surface bullate, dark olive-green, with a metallic lustre, a broad silvery zone

running all round, about 1in. from the margin. *fl.* in erect branching cyme, large, pale rose. Capsule wings, two short, one long and rounded. Assam, 1858. See Fig. 233. (B. M. 5101.) This magnificent species is the principal progenitor of the numerous ornamental-foliaged Begonias, a selection of which are given below. Most of them are well worth growing, but those named have been selected from a large number: MADAME WAGNER,* *l.* large, profound green, banded by a broad silvery zone, especially fine; MARSHALLI, *l.* very large, the margins and very centre dark green, while the greater portion of the surface is covered with a silvery-grey; REGINA,* *l.* rich olive-green, banded with a broad zone of bronze-red and silvery-grey, rendering it very attractive; ROI LEOPOLD,* *l.* on long stout petioles, very large, deep bronze-red in the centre, with a broad border of a rather lighter shade, very effective; ROLLISONI,* *l.* large, on long stalks, rich velvety-green, banded with silvery-grey; SPLENDIDA ARGENTEA,* *l.* large, of a greyish hue, veined with white, and tinged with bronze-red, very beautiful. The following varieties are also very good: ADRIEN ROBINE,* BERTHE PROUTIERE, CHARLES HOVEY, DISTINCTION,* JULIA SEROT,* LOUISE

CHRETIEN,* MADAME J. MENOREAU,* NARGA,* NAVALA,* TALISMAN, W. E. GUMBLETON.

B. Richardsiana (Richards').* T. Stem 1ft. high, erect, fleshy, with slender branches. *l.* palmately lobed, the lobes sinuate or toothed. *fl.* white, males bipetalous, females with five petals. Cymes axillary near ends of branches, few-flowered. Capsule three-winged, wings equal. Summer. Natal, 1871. (G. C., 1871, p. 1065.)

B. R. diadema (of gardens).* This is referred to here because of its close resemblance to the above. It is most likely a hybrid between *B. Richardsiana* and *B. dipetala*. *l.* palmately lobed, rather large, spotted with white. *fl.* large, rose-coloured. Summer. 1881.

B. ricinifolia (Ricinus-leaved).* A garden hybrid between *B. heracleifolia* and *B. peponifolia*. *l.* large, bronzy green, in shape like those of the Castor-oil plant. *fl.* numerous, on an erect scape. Winter. 1847.

B. Roezlii (Roezl's). Synonymous with *B. Lynchiana*.

B. rosacea (rosy). Stem succulent, short. *l.* ovate obtuse, slightly pubescent, toothed; petioles long, pilose. *fl.* in few-flowered cymes,

medium-sized, rose-coloured. New Grenada, 1860. (Garden, pl. 152.)

B. rosæflora (rose-flowered).* T. Stemless. Petioles, scapes, bracts, and stipules bright red. *l.* green, 2in. to 4in. wide, on stout hairy petioles, 2in. to 6in. long, orbicular-reniform, concave; margins lobed, red, toothed. Scapes stout, villous, three-flowered. *fl.* 2in. across, bright rose-red. Summer. Peru, 1867. One of the parents of the popular race of tuberous-rooted large-flowered Begonias. (B. M. 5680.)

B. rubricaulis (red-stalked).* Stemless. Leafstalks, peduncles, pedicels, and ovaries, a deep red colour. *l.* obliquely ovate, 4in. to 6in. long, slightly hairy, bright green, wrinkled; margins toothed and ciliated. Scape 1ft. high, erect, stout, branching at the top, forming a head of about a dozen flowers, which are large, white inside, rose-tinted outside. Capsule with one large wing, the others almost suppressed. Summer. Peru, 1834. (B. M. 4131.)

B. rubro-venia (red-veined).* Rootstock thick. Stems 12in. to 18in. high, red, pubescent. *l.* 4in. to 6in. long, elliptic or lanceolate acuminate, entire or slightly angular, toothed, green spotted with white above, purplish-brown below. Scapes

axillary, red. *fl.* in cymose head; outer segments white with rose-red veins, inner segments pure white. Summer. Sikkim, &c., 1853. (B. M. 4689.)

B. sanguinea (blood-red). S. Stems woody when old, tall, stout, red, with scattered paler spots. *l.* 4in. to 6in. long, unequally cordate, acuminate, thick and somewhat fleshy in texture, minutely crenate, green above, deep red below; peduncles axillary, long, erect, red. *fl.* in a branching cyme, rather small, white. Capsule wings sub-equal. Spring. Brazil, 1836. (B. M. 3520.)

B. scabrida (rough). Stem stout, erect, somewhat succulent, covered with small tubercles. *l.* 6in. long, oblique, ovate-acute, cordate, toothed, slightly hairy. *fl.* white, small; cyme many-flowered. Capsule wings equal, large. Venezuela, 1857.

B. scandens (climbing).* Stem flexuose, fleshy, creeping or climbing, smooth. *l.* 4in. long, ovate acuminate, sub-cordate; margins irregularly toothed, pale shining green. *fl.* in axillary branching cymes, white, small. South America, 1874. Useful either as a basket plant or for training against moist walls. SYNS. *B. elliptica*, *B. lucida*, *B. Moritziana*. (R. G. 758.)

B. sceptrum (princely). S. *l.*

obliquely ovate in outline, deeply lobed on one side; lobes oblong; obtuse, veins sunk, and the raised spaces between marked with large silvery blotches, and numerous smaller dots of silver grey. Brazil, 1883.

B. Schmidtiana (Schmidt's).* Stems 1ft. high, branching, herbaceous. *l.* obliquely cordate, ovate-acute, small, dark metallic green above, tinged with red below. *fl.* in loose drooping axillary panicles, white, small, numerous. Winter. Brazil, 1879. (R. G. 990.)

B. scutellata (salver-like). Synonymous with *B. conchæfolia*.

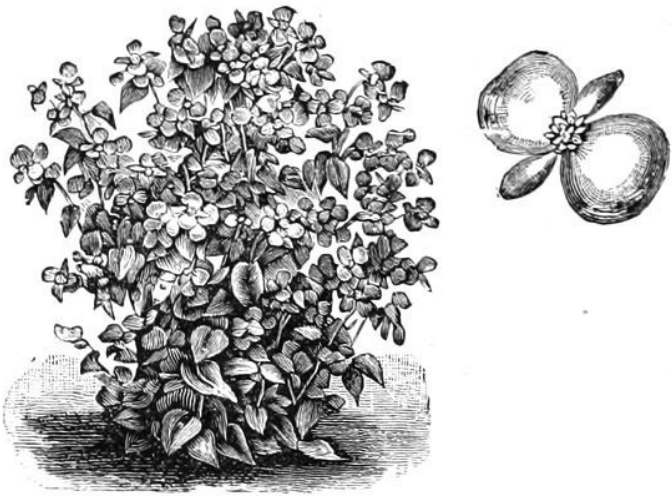


Fig. 234. Begonia semperflorens Frau Maria Brandt, showing Habit and Flower.

B. Sedeni (Seden's). T. A garden

hybrid between *B. boliviensis* and *B. Veitchii*. Summer. 1869. A handsome plant, but much inferior to many of the more recent hybrids. (R. H. 1872, 90.)

B. semperflorens (always-flowering).* Stem fleshy, erect, smooth, reddish-green. *l.* ovate-rotundate, hardly cordate; margins serrated, ciliated, surface smooth, shining green. *fl.* on axillary stalks, near apex of stems, white or rose, rather large. Capsule wings two short, one long, rounded. Autumn. Brazil, 1829. A useful summer and autumn flowering species, of which there are several named varieties more or less distinct from the type, either in colour or size of flowers, or in habit of plant. The varieties *carminea*, *gigantea*, and *rosea* are perhaps the best. SYN. *B. spathulata*. (B. M. 2920.)

B. s. Frau Maria Brandt. A dwarf compact variety, with rose-tinted flowers. See Fig. 234.

B. socotrana (Socotra).* Stem annual, stout and succulent, forming at base a cluster of bulbils, each of which produces a plant the following year; sparsely hairy. *l.* dark green, orbicular, peltate, 4in. to 7in. across, centre depressed; margin recurved, crenate. *fl.* in terminal, few-flowered cymes, 1½in. to 2in.

wide, bright rose. Capsule three-angled, one-winged. Winter. Socotra, 1880. Should be rested through the summer, and started in heat in September. A distinct and beautiful species. (B. M. 6555.)

B. spathulata (spathulate). Synonymous with *B. semperflorens*.

B. stigmosa (branded).* Rhizome creeping, fleshy. *l.* 6in. to 8in. long, oblique, cordate-acute, irregularly toothed, smooth above, hairy beneath, green, with brownish-purple blotches; stalks scaly, as in *B. manicata*. *fl.* in cymose panicles, white, medium-sized, numerous. Brazil, 1845.

B. strigillosa (strigillose).* Rhizome short, fleshy, creeping, *l.* 4in. to 6in. long, oblique, ovate-acute, cordate-toothed; margins ciliate, red; stalk and blade covered with fleshy scales; blade smooth, blotched with brown. *fl.* in branching cymes, dipetalous, small, rose-coloured. Summer. Central America, 1851.

B. suaveolens (sweet-scented). S. Stem branching, 2ft. high, smooth. *l.* 3in. to 4in. long, oblique-ovate, cordate-acute, crenulate, glabrous. *fl.* in axillary panicles, large, white. Winter. Central America, 1816. Resembles *B. nitida*, but may be distinguished by its distinctly crenulate leaves and smaller flowers,

which are white, and not pale rose, as in *B. nitida*. SYN. *B. odorata*. (L. B. C. 69.)

B. Sutherlandi (Sutherland's).* T. Stems annual, 1ft. to 2ft. high, slender, graceful, red-purple. *l.* on slender red petioles, 2in. to 3in. long; blade 4in. to 6in. long, ovate-lanceolate, deeply lobed at base; margins serrate, bright green; nerves bright red. *fl.* in axillary and terminal cymes, numerous, orange-red, shaded with dark vinous-red. Capsule wings equal. Summer. Natal, 1867. (B. M. 5689.)

B. Teuscheri (Teuscher's). S. A strong, erect-growing, large-leaved plant, from the Dutch Indies, not yet flowered. *l.* cordate-ovate, acute, olive-green above, with greyish blotches; under side rich claret-coloured. Hort. Linden. (I. II. 1879, 358.)

B. Thwaitesii (Thwaites's).* Stemless. *l.* 2in. to 4in. in diameter, obtuse or sub-acute, cordate at base, minutely toothed, slightly pubescent, very shaggy when young, rich coppery-green, red-purple and blotched with white; under side blood red. *fl.* in an umbel, medium-sized; scape short, white. Capsule shaped like a Beech nut; wings short. Ceylon, 1852. One of the most beautiful of coloured-leaved

Begonias, requiring a close, moist atmosphere in a stove. (B. M. 4692.)

B. ulmifolia (Elm-leaved). S. Stem 2ft. to 4ft. high, branching. *l.* 3in. to 4in. long, ovate-oblong, unequal-sided, toothed, rugose, hairy. *fl.* on hairy peduncles, numerous, small, white. Capsule wings two small, one large, ovate. Winter. Venezuela, 1854. (L. C. 638.)

B. undulata (wavy-leaved). S. Stem 2ft. to 3ft. high, erect, branching freely, turgid below, green, succulent until old. *l.* distichous, oblong-lanceolate, undulated, smooth, shining green. *fl.* in nodding axillary cymes, white, small. Winter. Brazil, 1826. (B. M. 2723.)

B. urophylla (caudate-leaved). Stemless. Leafstalks terete, succulent, clothed with scattered bristly hairs. *l.* large, 12in. long, broad, cordate; margin irregularly cut, toothed; apex long-pointed, green, smooth above, hairy beneath; peduncle stout, paniculate. *fl.* crowded, large, dipetalous, white. Spring. Brazil. (B. M. 4855.)

B. Veitchii (Veitch's).* T. Stem very short, thick, fleshy, green. *l.* orbiculate, cordate, lobed and incised; margins ciliated, green, principal nerves radiating from bright carmine spot near centre; under side pale green; petiole thick,

terete, with a few hairs on the upper portion; scape 10in. to 12in. high, thick, terete, pilose, two-flowered. *fl.* 2¼in. in diameter, cinnabar red. Capsule smooth, two short, one long wings. Summer. Peru, 1867. One of the species from which the popular garden tuberous-rooted Begonias have been obtained. (B. M. 5663.)

B. Verschaffeltiana (Verschaffelt's).* A hybrid between *B. carolinæfolia* and *B. manicata*, with large ovate acutely-lobed leaves and flowers in large cymes, rose-coloured and pendent. Winter. (R. G. 1855, p. 248.)

B. vitifolia (Vine-leaved). S. Stem 3ft. to 4ft. high, thick, smooth, and fleshy. *l.* large as vine foliage, and similar in shape; peduncles axillary, erect, branching into a cymose head of small white flowers. Capsules three-angled, one-winged. Winter. Brazil, 1833. SYNS. *B. grandis*, *B. reniformis*. (B. M. 3225.)

B. Wagneriana (Wagner's). S. Stem 2ft. to 3ft. high, erect, glabrous, green, succulent, branched. *l.* cordate-ovate, acuminate; margins obscurely lobed, slightly serrate, quite glabrous; peduncles axillary and terminal, cymose. *fl.* numerous, white. Capsules, which are ripened in abundance, three-angled, one wing long, two short. Winter.

Venezuela, 1856. (B. M. 4988.)

B. Warscewiczii (Warscewicz's). Synonymous with *B. conchæfolia*.

B. Weltoniensis (Welton). A garden hybrid; one of the oldest of cultivated winter-flowering kinds, with light pink flowers, very free.

B. xanthina (yellow-flowered).* Stem short, thick, fleshy, horizontal, along with petioles thickly-clothed with brown scaly hairs; petioles 6in. to 12in. long, stout, terete, fleshy, reddish-brown; blade 8in. to 12in. long, cordate-ovate, acuminate, sinuate-ciliated, dark green above, purplish beneath. Flower-stalks erect, 1ft. high, bearing a cymose head of large golden flowers. Capsule with one large wing. Summer. Boutan, 1850. (B. M. 4683.)

B. x. Lazuli (Lapis-lazuli).* Foliage metallic purple, with a bluish tinge.

B. x. pictifolia (ornamented-leaved).* *l.* with large silvery spots, and pale yellow flowers.

The following list comprises a selection of some of the best and most distinct of the innumerable varieties now existing in gardens, and which have been obtained by crossing and re-crossing the several tuberous-rooted species found in the temperate regions of South America.



Fig. 235. Flowering Branch of Begonia Admiration.

Single-Flowered Varieties. *Crimson and Scarlet Shaded*: Admiration, flowers vivid orange-scarlet, of dwarf, compact habit, and free flowering (see Fig. 235); Arthur G. Soames,* brilliant crimson scarlet, of excellent form, and very free; Ball of Fire,* glowing fiery-scarlet, flowers large and compact, very free; Black Douglas,* dark carmine crimson, flowers large, of the finest form, one of the best; Brilliant, deep orange-scarlet, very free; Charles Baltet, rich velvety vermilion;

COMMODORE FOOT,* brilliant velvety crimson, very free and showy; DAVISII, flowers small, dazzling scarlet, habit dwarf and free; DR. MASTERS,* flowers large, with immense spikes, deep red-crimson, very attractive; DR. SEWELL,* glowing crimson, grand form; EXONIENSIS, brilliant orange-scarlet, immense flowers; F. E. LAING, deep velvety crimson, full and free; HON. MRS. BRASSEY,* deep glowing crimson, very rich and floriferous; J. H. LAING,* brilliant scarlet, one of the freest; J. W. FERRAND,* rich vermilion, dwarf and free, one of the finest for bedding; LOTHAIR,* dark scarlet-carmine, crimson shaded, of grand form and size; MARQUIS OF BUTE, brilliant carmine-crimson, of the finest form, and immense flowers; SCARLET GEM,* very dark scarlet, flowers medium-sized, dwarf and very floriferous; SEDENI, rich rosy-crimson, dwarf, a good bedder; VESUVIUS,* bright orange-scarlet, compact and free, one of the finest bedders.



Fig. 236. Begonia Queen of Whites.

Rose-Coloured: Albert Croussé,* bright salmon-rose, very free; Annie Laing,* large and free, rich pink; Capt. Thompson, rich salmon-rose, very free and compact; Delicatum, pale flesh-rose; Exquisite,* rich deep rose, very free and showy; J. Aubrey Clark, flowers very large, rich, deep; Jessie,* soft rosy-pink, with the tips of the petals shaded carmine, a very fine, perfect variety; Lady Brooke,* dark rose, shaded magenta, very perfect in form, and large; Lady Hume Campbell,* pale pink, of good form and size, an exquisite variety;

MADAME STELLA,* flowers perfect in form, large, bright rosy-pink, one of the best; MARCHIONESS OF BUTE, light rosy-pink, with an immense bloom and handsome foliage; PENELOPE,* rich salmon-rose, very free and good; PRINCESS OF WALES, very delicate pink, and free; ROSE D'AMOUR, rich rose, delicately shaded.

White-Flowered: ALBA FLORIBUNDA, flowers medium-sized, very free; MOONLIGHT, very free, with good flowers and handsome foliage; MRS. LAING,* flowers exquisite in form and shape, pure white, one of the best; NYMPH,* large and round, white, tinted with rose at the base; PRINCESS BEATRICE,* flowers large, of excellent form, and pure in colour; PURITY, flowers round, good size and colour; QUEEN OF WHITES,* flowers pure white, large, most freely produced (see Fig. 236, for which we are indebted to Messrs. Veitch and Sons); REINE BLANCHE,* one of the best, very pure; SNOWFLAKE,* flowers large, in full spikes, pure white, habit compact, and very free.

Yellow and Orange-Flowered: CHROMATELLA,* habit dwarf and compact, pure yellow; EMPRESS OF INDIA, deep yellow, very showy; GEM OF YELLOWS,* rich deep yellow, of grand form and size, one of the best;

GOLDEN GEM,* rich golden yellow, of excellent form and size, habit free, with prettily mottled foliage; J. L. MACFARLANE, rich orange, freest form, and large; LADY TREVOR LAWRENCE,* orange-yellow, of good form, with handsome foliage; MAUDE CHURCHILL,* pale yellow, deeper shaded, with elegant foliage; MRS. PONTIFEX,* rich orange yellow, very large flowers, copiously produced; POLLIE, pale yellow, fine round flower; SULPHUR QUEEN,* pale sulphur-yellow, of good form and size.

Double-Flowered Varieties. *Crimson and Scarlet Shaded*: ACHILLES, rich dark crimson, very large and free; DAVISII HYBRIDA FL.-PL.,* rich coral-red, very full and free; DAVISII FL.-PL. SUPERBA,* brilliant crimson-scarlet, of good size, and extremely free; DR. DUKE,* brilliant scarlet, very large and double, one of the best; FRANCIS BUCHNER,* rich cerise-red, very double, perfect in form, and very large; FULGURANT, rich crimson, full, with dark foliage; GLOIRE DE NANCY,* rich vermilion, very free; HERCULES,* bright orange-scarlet, very large and extremely free, habit compact and vigorous; LEMOINEI, deep orange-vermilion, very floriferous; MONSIEUR BAUER, deep red, tinged with violet; NIMROD,* rich red-scarlet, very large and full, with

a free and very vigorous habit; PRESIDENT BURELLE,* glowing red, tinted with scarlet, very free; QUEEN OF DOUBLES,* rich rosy-crimson, very double and floriferous, one of the best varieties; ROBERT BURNS,* brilliant orange-scarlet, tinted vermilion, very double and free; SIR GARNET, deep orange-scarlet, very vigorous; WM. BEALBY,* deep velvety scarlet, immense size and perfect form, very free.

Rose-Coloured: ADA,* bright rosy-salmon, fringed at the edge, very full and free; COMTESSE H. DE CHOISEUL, pale rose, at first nearly white, very handsome; ESTHER,* rich rosy pink, with a distinct crimson margin; FORMOSA,* rich rosy carmine, with a white centre and crimson margin, very distinct and showy; GLORY OF STANSTEAD,* deep rose, with a well-defined white centre, very distinct and handsome; JOHN T. POE,* bright rose, tinted with cerise, of excellent form and vigorous habit; MADAME COMESSE,* rich satiny salmon-rose, immense, and most profuse; MADAME LEON SIMON, soft pale rose, very full and free; MARIE LEMOINE, light salmon with a rose centre; MRS. BRISSENDEN,* salmon-rose, with a cream-white centre, of excellent form and very free; PÆONIFLORA, flowers enormous, rich salmon-rose, very full; QUEEN OF SCOTS,* satiny-

pink, salmon-shaded, of a perfect form and very large, habit compact and very free; ROSINA,* deep rose, violet shaded, of exquisite form, very vigorous and free.

White-Flowered: ANTOINETTE QUERIN,* pure white, cream, shaded centre, very large and full, a magnificent variety; BLANCHE JEANPIERRE, pure white, cream tinted, of excellent form and very free; LITTLE GEM,* pure white, of the best form and good size, habit dwarf and extremely floriferous; MRS. LUDLAM,* white, tinted with pink, a very handsome variety; PRINCESS OF WALES,* flowers very full and profuse, almost pure in colour, and immense.

Yellow-flowered: CANARY BIRD,* flowers large, of the finest form, deep yellow, habit dwarf and very free; GABRIEL LEGROS,* pale sulphur, changing to yellow, very full and imbricated, extremely showy.

BEGONIACEÆ. An order comprising a large number of useful garden plants. The only genera are *Begonia* and *Begoniella* (which is not yet in cultivation). Flowers apetalous; perianth single; pistillate flowers having the perianth two to eight-cleft, staminate ones two to four-cleft; stamens numerous, collected into a head. Leaves alternate, stipulate. *See* **Begonia.**

BEJARIA. *See* **Befaria.**

BELLADONNA. *See* **Atropa.**

BELLADONNA LILY. *See* **Amaryllis Belladonna.**

BELLEVALIA (named in honour of P. R. Belleval, a French botanist). ORD. *Liliaceæ*. This genus is now usually placed under *Hyacinthus*. Hardy, bulbous-rooted plants, admirably adapted for spring bedding or forcing, and invaluable as cut flowers. Flowers small, whitish, or violet, tinged with green. Leaves few, radical, broadly linear. They are of extremely easy culture in ordinary garden soil. Propagated by offsets; also by seeds, which should be sown as soon as ripe.

B. operculata (lid-covered). Synonymous with *B. romana*.

B. romana (Roman).* Roman Hyacinth. *fl.* white, racemose; perianth campanulate; pedicels longer than the flowers. April. *l.* from 4in. to 5in. long. *h.* 6in. Italy, 1596. A most desirable plant, and the best of the genus for forcing purposes. SYNS. *B. operculata* and *Hyacinthus romanus*. (B. M. 939, under the name of *Scilla romana*.) *See* **Hyacinthus**.

B. syriaca (Syrian).* *fl.* white; peduncles spreading, racemose. May. *l.* glaucous, 1ft. long, channelled, rather scarious on the margins. *h.* 1ft. Syria, 1840.

BELL-FLOWER. *See* **Campanula.**



FIG. 237. FRENCH BELL GLASS, OR CLOCH

BELL GLASSES, or **CLOCHES**. These are used for the purpose of protecting or accelerating the growth of a plant or plants. The French Cloche (see Fig. 237) is largely employed for this purpose. Ordinary Bell Glasses (see Fig. 238) are exceedingly useful for propagating purposes, especially for hard-wooded plants; or for placing over subjects which require a very moist atmosphere, such as Filmy ferns, Cephalotus, &c.; or for covering half-hardy plants or rare alpines, and thus protecting them from excessive moisture. Large Bell Glasses, inverted, serve as miniature aquaria, and many small aquatics are easily grown in them.

BELLIDIASTRUM (from *bellis*, a daisy, and *astrum*, a star; flower-heads being star-like). ORD. *Compositæ*. A pretty dwarf, hardy, herbaceous perennial, allied to *Aster*. It thrives in a compost of loam, leaf soil, and peat. Increased by divisions in early spring, or directly after blooming.

B. Michelii (Michel's).* *fl.-heads* white; scape one-headed, naked; involucre with equal leaves; pappus simple. June. *l.* in a rosette, shortly stalked, obovate, repand. *h.* 1ft. Austria, 1570.

BELLIS (from *bellus*, pretty, in reference to the flowers). Daisy. ORD. *Compositæ*. A genus of hardy herbaceous perennials, distinguished from allied genera in having conical receptacles and an absence of pappus. They grow well in all loamy soils. The garden varieties are increased by division after flowering, each crown making a separate plant. The soil must be pressed about them moderately firm. Seeds may also be sown in March, but the plants thus obtained are seldom of sufficient floricultural merit to perpetuate.



FIG. 239. BELLIS PERENNIS FLORE-PLENO.



Fig. 240. Hen and Chickens Daisy (Bellis perennis prolifera).

B. perennis (perennial).* Common Daisy. *fl.-heads* white. June. *l.* numerous, lying flat on the ground, obovate, crenate, slightly hairy, tapering at the base. *h.* 3in. England. The varieties are very numerous, the double ones being particularly fine. See Fig. 239. The handsome variegated form, *aucubæfolia*, has its leaves richly stained and veined with yellow. There are both red and white-flowered forms of this variety. The Hen and Chickens Daisy is a proliferous form, rather more quaint than pretty. See Fig. 240. Good garden kinds are *B. p. conspicua*, red;

CROWN, pink; ELIZA, purple; RUBENS, red; SNOWFLAKE, white.



FIG. 241. BELLIS ROTUNDIFOLIA CŒRULESCENS.

B. rotundifolia cœrulescens (round-leaved, bluish).* *fl.-heads* from ¾in. to 1¼in. in diameter, resembling those of the common Daisy, but with fewer, often broader, ray-flowers, which vary from white to pale blue. *l.* more or less hairy,

with slender stalks, 1in. to 3in. long; blade ovate or sub-cordate, sinuate toothed, three-nerved. Morocco, 1872. A very beautiful perennial, requiring the shelter of a cold frame during severe winters. See Fig. 241. (B. M. 6015.)

BELLIUM (from *bellis*, a Daisy; the flowers resembling those of that plant). ORD. *Compositæ*. A genus of pretty little, free-flowering plants, differing from the common Daisy only in having a pappus of six to eight broad scales, torn at the apex, alternating with a like number of long scabrous bristles. They thrive best in a mixture of sandy loam and peat. Propagation is readily effected by means of seeds or divisions; the latter should be made in spring.



FIG. 242. BELLIUM BELLIDIOIDES.

B. bellidioides (Daisy-like).* *fl.-heads* white, solitary. June to September. *l.* spathulate, radical. Stolons creeping. *h.* 4in. Italy, 1796. Annual. See Fig. 242.

B. crassifolium (thick-leaved). *fl.-heads* whitish-yellow; scapes much exceeding the leaves, downy. June. *l.* sub-radical, thick, obovate, entire, attenuate at base, rather downy. Stems many, ascending. *h.* 6in. Sardinia, 1831. Hardy perennial. (S. B. F. G. 2, 278.)

B. minutum (very small).* *fl.-heads* white and yellow, ½in. across, on slender stalks, longer than the foliage. June to September. *l.* narrow spathulate, attenuated at the base, slightly hairy. *h.* 3in. Levant, 1772. A rare little species, requiring a warm, well-drained position on the rockery.

BELLOWS. These were formerly employed for fumigating, but are now entirely superseded by the ordinary fumigators. The Sulphur Bellows is a very useful instrument for the uniform distribution of flowers of sulphur on vines and other subjects infested with mildew. In form it is very like those in common domestic use, but has a rose of small holes at the end of its nozzle, through which the sulphur is ejected.

BELL-PEPPER. *See* **Capsicum grossum.**

BELOPERONE (from *belos*, an arrow, and *peronne*, a band; in reference to the arrow-shaped

connectivum). SYN. *Dianthera*. ORD. *Acanthaceæ*. Very pretty stove evergreen shrubs, allied to *Justicia*. Flowers blue or purple, borne in secund, axillary, or terminal spikes, frequently subtended with coloured bracts; corolla gaping, the upper lip concave, the lower trifid. They are easily cultivated in a compost of loam, leaf soil, peat, and sand. Propagated by young cuttings, taken in spring. Beloperones may also be treated like *Justicias* (which *see*), and will succeed admirably. There are a large number of species, but few of which have been introduced.

B. oblongata (oblong). *fl.* rosy-purple; spikes axillary; anthers calcarate at base; bracts bracteolate. Summer. *l.* oblong-lanceolate, opposite. *h.* 3ft. Brazil, 1832. (B. H. 9, 9.)

B. violacea (violet-coloured).* *fl.* violet. *l.* lanceolate, acuminate, entire. *h.* 3ft. New Grenada, 1859. (B. M. 5244.)

BENDING-DOWN the branches of fruit trees, by means of weights or string attached to pegs driven into the ground, is sometimes resorted to for the purpose of acquiring a particular shape, or fruitfulness; but authorities differ as to the usefulness of the plan for the latter purpose. Young trees that are inclined to grow strong in the middle may be more evenly balanced by adopting the plan of Bending the strong branches, and so diverting the sap to the weaker ones.

BENGAL QUINCE. *See* **Ægle Marmelos**.

BENJAMIN-TREE. *See* **Ficus Benjamina**.

BENT GRASS. *See* **Agrostis**.

BENTHAMIA (in honour of George Bentham, a distinguished English botanist). ORD. *Cornaceæ*. Hardy evergreen shrubs or low trees, now referred to the genus *Cornus*. The first-named species is rather tender in the neighbourhood of London, and can only be grown successfully against a wall, for which purpose it is very suitable. In Cornwall and other mild places, it attains a height of 20ft. in the open. Loudon thinks it might be rendered hardier by grafting it on *Cornus sanguinea*. Flowers disposed in heads, each head attended by an involucre, which consists of four petal-like parts, and resembles a corolla; calyx with a minute four-toothed limb; petals four, fleshy, wedge-shaped; stamens four; style one. Leaves opposite, exstipulate, sub-evergreen, entire. Fruit constituted of many pomes grown together. They thrive in rather moist, loamy soil, in a sheltered spot. Propagated by seeds, sown when ripe, in a cool-house; or by layering, in autumn.

B. fragifera (Strawberry-flowered).* *fl.* large, white, sessile, densely aggregate, forming a round head. June to October. *fr.* large, about the size of that of the common Arbutus, reddish. *l.* lanceolate, acuminated at both ends, on short petioles, rather rough, with small, adpressed down. Branches spreading, smooth. *h.* 10ft. to 15ft. Nepaul, 1825. (G. C. xiv., 728.)

B. japonica (Japanese). *fl.* yellowish-red. Spring. *h.* 8ft. Japan, 1847. (S. Z. F. J. 16.)

BERARDIA (named after M. Berard, a Professor of Chemistry at Montpelier). ORD. *Compositæ*. A genus containing a single species, confined to the high mountains of Western Europe. It makes a pretty rock plant, and grows best in thoroughly well-drained spots amongst rocky *débris*. Propagated by seeds, sown in spring.

> **B. subacaulis** (almost stemless). *fl.-heads* whitish, solitary, very large. *l.* rounded oval, nearly heart-shaped at base, cottony. *h.* 3in. or 4in. (A. F. P. 3, 38.)

BERBERIDACEÆ. An order of shrubs or herbaceous perennials. Flowers terminal or axillary, usually racemose; sepals three, four, or six in a double row; petals as many or double in number; stamens four to eight, opposite the petals. Fruit, a berry or capsule. Leaves alternate, compound. The order contributes a great number of handsome plants to our gardens. Well-known genera are *Berberis*, *Epimedium*, and *Nandina*.

BERBERIDOPSIS (from *Berberis*, the Barberry, and *opsis*, like; resembling the Barberry). ORD. *Berberidaceæ*. A handsome evergreen shrub, with climbing habit. Sepals and petals nine to fifteen; outer small, spreading; intermediate orbicular, concave; inner obovate-cuneate, erect, inserted upon the fleshy torus. Stamens eight to nine, free. With a slight winter protection, or planted at the foot of a south wall, it will prove quite hardy, being of easy culture in ordinary garden soil. It is an excellent plant for the cool greenhouse. Increased by seeds, which should be sown in spring; by layering, in autumn; or by young cuttings, in spring.

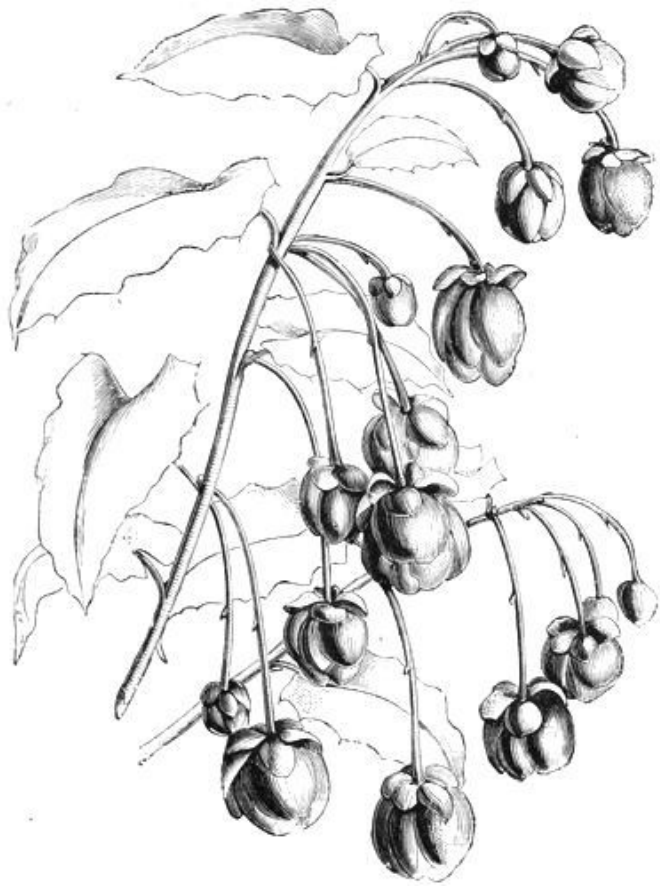


FIG. 243. FLOWERING BRANCHES OF BERBERIDOPSIS CORALLINA.

B. corallina (coral-red).* *fl.* crimson, in terminal, drooping racemes, leafy at the base. *l.* about 3in. long, alternate, simple, petiolate, oblong-cordate, obtuse or acute, spiny-toothed. Chili, 1862. See Fig. 243. (B. M. 5343.)

BERBERIS (*Berberys* is the Arabic name of the fruit,

signifying a shell; many authors believe this to be the original derivation of the word, because the leaves are hollow, like a shell). Barberry. ORD. *Berberidaceæ*. Including *Mahonia*. A genus of hardy erect or trailing shrubs. Flowers yellow or orange, racemose or fascicled; sepals and petals similar, in two series. Leaves simple or compound, alternate or fascicled from the non-development of the branches, often spinose, or reduced to spines. The common sorts thrive well in any ordinary garden soil, but the rarer kinds require a compost of loam, peat, and a little sand. Propagation may be effected by suckers or layers, put down in the autumn; by ripened cuttings, taken at the same time, and planted in sandy soil, in a cold frame; or by seeds, sown in the spring, or, preferably, in the autumn, when, if fresh from the pulp or berry, they will germinate in the open in the following spring. The last-named is the method generally adopted.

B. Aquifolium (Holly-leaved).* *fl.* yellow; racemes nearly erect, much crowded. Spring. *l.*, leaflets two to three pairs, with an odd one, the lower part distant from the petiole; ovate, approximate, cordate at the base, one-nerved, spiny-toothed. *h.* 3ft. to 6ft. North America, 1823. This is extensively planted in woodlands as an excellent covert plant. SYN. *Mahonia aquifolia*. (S. E. B. 49.)

B. aristata (bearded). *fl.* yellow; racemes nodding, many-flowered, longer than the leaves; pedicels trifid, three-flowered. Spring. *l.*

obovate-oblong or lanceolate, mucronate, membranous, smooth, serrated with four or five spinulose teeth; lower spines three-parted, upper ones simple, and hardly bidentate at the base. *h.* 6ft. Nepaul, 1820. (B. R. 729, under name of *B. Chitria*.)

B. asiatica (Asiatic). *fl.*, racemes short, many-flowered, corymbose, shorter than the leaves; pedicels elongated, one-flowered. *l.* oval, cuneated, or elliptical, mucronate, smooth; under surface glaucous, entire, or spinulosely-toothed; spines trifid, or simple. *h.* 4ft. to 8ft. 1820. Half-hardy.

B. buxifolia (Box-leaved).* *fl.* solitary, on slender peduncles. Spring. *l.* nearly sessile, oval or oblong, about ½in. long, entire. *h.* 8ft. Straits of Magellan, 1830. *Nana* is a charming little variety, not exceeding 18in. in height. SYN. *B. dulcis*. (B. M. 6505.)

B. canadensis (Canadian).* *fl.*, racemes many-flowered, nodding. Spring. *l.* obovate-oblong, remotely serrated; upper ones nearly entire; spines three-parted. *h.* 4ft. Canada, 1759.

B. cratægina (Hawthorn-like). *fl.*, racemes many-flowered, crowded, spreading, scarcely longer than the leaves. Spring. *l.* oblong, reticulated,

hardly serrated; spines simple. *h.* 4ft. to 8ft. Asia Minor, 1829.

B. cretica (Cretan). *fl.*, racemes three to eight-flowered, rather shorter than the leaves. Spring. *l.* oblong-oval, entire, or somewhat serrated; spines three to five-parted. *h.* 4ft. to 5ft. Crete and Cyprus, 1759. The variety *serratifolia* has leaves ciliately-serrated. (S. F. G. 342.)

B. Darwinii (Darwin's).* *fl.* orange, racemose, very numerous. May, and sometimes again in autumn. *l.* oval or oblong, about 1in. long, with usually five spiny teeth. *h.* 2ft. South Chili, 1849. This very fine species is, perhaps, the best; it forms a densely-branched, spreading, evergreen bush, thus making an excellent covert plant. (B. M. 4590.)

B. dulcis (sweet). Synonymous with *B. buxifolia*.

B. emarginata (emarginate). *fl.*, racemes scarcely pendulous, shorter than the leaves. Spring. *l.* lanceolate-obovate, ciliately serrated; spines three-parted. *h.* 6ft. Siberia, 1790.

B. empetrifolia (Empetrum-leaved).* *fl.* few, terminal, sub-umbellate, on slender pedicels. May. *l.* in fascicles of about seven, linear, closely revolute, sharply mucronate. *h.* 1½ft. to 2ft. Straits of Magellan,

1827. (B. R. 26, 27.)

B. fascicularis (fascicled). *fl.*, racemes erect, much crowded. Spring. *l.*, leaflets three to six pairs, with an odd one, the lower pair distant from the base of the petiole; ovate-lanceolate, rather distant, one-nerved, spiny toothed, with four to five teeth on each side. *h.* 6ft. to 8ft. New Spain, 1820. Half-hardy. SYN. *Mahonia fascicularis*. (B. M. 2396.)

B. floribunda (many-flowered).* *fl.*, racemes many-flowered, loose, solitary, pendulous. June. *l.* obovate-lanceolate, or obovate-oblong, tapering much towards the base, ending in a mucrone at the apex, paler beneath, spiny-ciliated; spines three-parted, unequal. *h.* 10ft. Nepaul. A variety of *aristata*.

B. Fortunei (Fortune's).* *fl.* small, in terminal clustered racemes. *l.*, leaflets about seven, linear-lanceolate, distant, with numerous small spiny teeth, lower pair remote from the base of the petiole. China.

B. glumacea (glumaceous). A synonym of *B. nervosa*.

B. iberica (Iberian). *fl.*, racemes many-flowered, pendulous. Spring. *l.* obovate-oblong, quite entire; spines simple and three-parted. *h.* 8ft. to 10ft. Iberia, 1818.

B. ilicifolia (Holly-leaved). *fl.*,

peduncles short, four-flowered; pedicels elongated, somewhat corymbose. July. *l.* ovate, tapering at the base, coarsely and spinulosely toothed; spines three-parted. *h.* 2ft. to 3ft. Tierra del Fuego, 1791. (B. M. 4308.)

B. japonica (Japanese).* *fl.*, racemes in terminal clusters. Spring. *l.*, leaflets usually nine, about 3in. long, quite sessile, broadly cordate, or rotundate at the base, oblique, with about five long spiny teeth, and a terminal one, the lowest pairs close to the base of the petiole. China and Japan. Very distinct, with unbranched stems and leaves about 1ft. long. *B. Beali* and *B. intermedia* are mere forms of this species, the latter differing from it in having narrower leaves and longer, slender racemes. (B. M. 4852.)

B. loxensis (Loxanese). *fl.* unusually small, erect, in panicled racemes on a long peduncle quite clear of the leaves. *l.* very shining, blunt, obovate; sides often with several teeth; spines small, palmated. *h.* 3ft. to 4ft. Peru. Evergreen, not hardy. (P. F. G. 1, p. 13.)



Fig. 244. Berberis nepalensis.

B. nepalensis (Nepaulese).* *fl.* yellow; racemes few, elongated, slender. *l.* 1ft. to 2ft. long; leaflets five to nine pairs, obovate-oblong, cuspidate, rounded at the base, repand-toothed, with five to ten spiny teeth on each side, tricuspidate at the apex. *h.* 4ft. to 6ft. Nepaul. A very handsome species, thriving best in the southern parts of England. Syn. *Mahonia nepalensis*. See Fig.

244.

B. nervosa (large-nerved). *fl.*, racemes elongated. October. *l.*, leaflets five to six pairs, with an odd one, the lower pair distant from the petiole; ovate, acuminated, remotely spiny toothed, somewhat three to five-nerved, with twelve to fourteen teeth on each side. *h.* 1ft. to 3ft. North America, 1826. SYNS. *B. glumacea*, *Mahonia nervosa*. (B. M. 3949.)

B. repens (creeping).* *fl.*, racemes terminal, numerous, fascicled, diffuse, rising from the scaly buds. Spring. *l.*, leaflets, two to three pairs, with an odd one, roundish-ovate, opaque, spiny toothed. *h.* 1ft. to 2ft. North America, 1822. SYN. *Mahonia repens*. (B. R. 1176.)

B. ruscifolia (Ruscus-leaved). *fl.* a little larger than those of *B. vulgaris*; peduncles short, bearing four to five flowers at the apex. *l.* oblong, tapering at the base, mucronate, entire, or grossly and spiny toothed. *h.* 4ft. to 8ft. South America, 1823. Half-hardy.

B. sinensis (Chinese).* *fl.*, racemes many-flowered, nodding. May. *l.* oblong, obtuse, entire, or the lower ones are a little toothed; spines three-parted. *h.* 3ft. to 6ft. China, 1815. (B. M. 6573.)

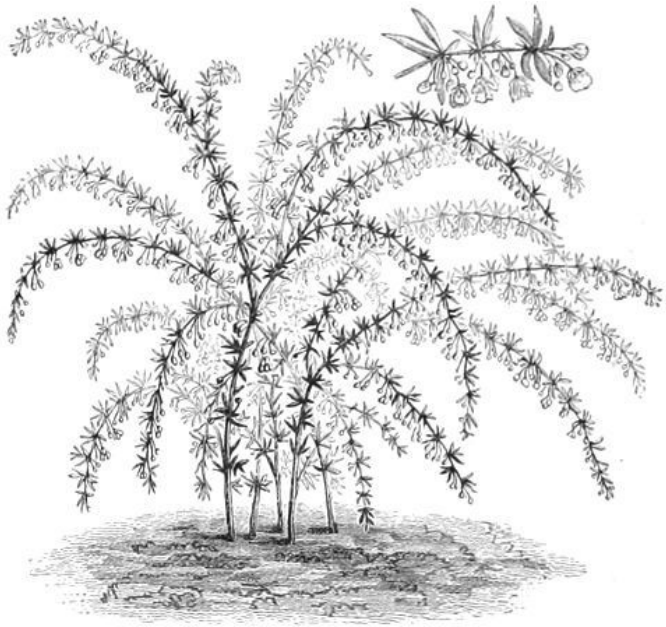


Fig. 245. Berberis stenophylla, showing Habit and Flowering Twig.

B. stenophylla (naked-leaved),* with narrow mucronate leaves, is said to be a hybrid between *B. empetrifolia* and *B. Darwinii*. See Fig. 245.

B. trifoliata (three-leafleted). *fl.*, racemes small, axillary, sessile, three to five-flowered. Spring. *l.*, leaflets three, sessile at the ends of the petioles, deeply scalloped, bluish-green, variegated, glaucous beneath. *h.* 5ft. Mexico, 1839. Evergreen, not quite hardy. (P. F. G. 2, 168.)

B. trifurcata (three-forked). *fl.*, racemes compound, erect. Spring. *l.*

pinnate; leaflets broad, three-forked. *h.* 6ft. China, 1850. Evergreen. (P. F. G. 3, 258.)

B. umbellata (umbellate). *fl.*, peduncles solitary, erect, bearing at the top several umbellate pedicels. *l.* obovate-oblong, mucronate, entire, glaucous beneath; spines three-parted, long, equal. *h.* 6ft. Nepaul, 1842. (P. F. G. 2, 181.)

B. vulgaris (common).* Common Barberry. *fl.*, racemes many-flowered, pendulous. Spring. *l.* somewhat obovate, ciliately-serrated; spines three-parted. *h.* 8ft. to 20ft. Britain, &c. There are yellow, violet, purple, black, and white fruited, and purple-leaved forms. (Sy. En. B. 51.)

B. Wallichiana (Wallich's).* *fl.* on drooping, aggregated peduncles, six to eight or more in a cluster. Spring. *l.* in alternate fascicles, 2in. to 3in. long, spreading or recurved, lanceolate, sinuato-serrate; spines deeply three-parted, slender but rigid. *h.* 6ft. to 10ft. Nepaul, 1820. See Fig. 246. (B. M. 4656.)

BERCHEMIA (in honour of M. Berchem, a French botanist). ORD. *Rhamnaceæ*. A genus of erect, or twining, deciduous, mostly greenhouse shrubs. Flowers sub-umbellate, in the axils of the upper leaves, or disposed in terminal panicles. Leaves alternate, many-nerved, entire. The species

mentioned below is probably the only one yet in cultivation. It is quite hardy, will grow in any common soil, and is well adapted for bowers or trellis-work. Propagated by ripened cuttings, and slips of the root, planted under a hand glass; or by layering the young shoots.

> **B. volubilis** (twining).* *fl.* greenish-white; panicles small, axillary and terminal. Drupe oblong, violaceous. June. *l.* oval, mucronate, a little wavy. Branches smooth. Carolina, 1714. A deciduous twiner. (G. G. 165.)

BERGAMOT. *See* **Mentha odorata**.

BERGERA (named after C. J. Berger, a distinguished Danish botanist). ORD. *Rutaceæ*. Interesting stove evergreen trees, now usually referred to *Murraya*. Leaves impari-pinnate; leaflets alternate, acuminated, pubescent. They thrive in a mixture of turfy loam and peat. Propagated by ripened cuttings, taken off at a joint, and placed in sand, under a hand glass, in bottom heat; or by layers.

> **B. Kœnigi** (Konig's). *fl.* whitish-yellow, small; racemes many, forming a corymb at the top of the branches. June. *l.*, leaflets serrated. *h.* 40ft. India, 1820. (L. B. C. 1019.)

BERKHEYA (named after M. J. L. de Berkhey, a Dutch botanist), ORD. *Compositæ*. A genus of ornamental greenhouse or hardy thistle-like herbs or shrubs. Flower-heads surrounded by a spiny involucre, the scales of which are united at the base

only; pappus of many flat, obtuse, or pointed, scales. They are of easy cultivation in a sandy loam soil. The perennials are increased by cuttings placed under a glass; the herbaceous perennials usually by divisions of the plant in spring. The species most frequently seen in English gardens is *B. purpurea*.



Fig. 246. Berberis Wallichiana.

B. grandiflora (large-flowered).* *fl.-heads* yellow; scales of involucre spiny toothed. July. *l.* opposite, lanceolate, three-nerved, spiny toothed, downy beneath. *h.* 2ft. Cape of Good Hope, 1812. Greenhouse

evergreen. (B. M. 1844.)

B. pinnata (pinnate). *fl.-heads* yellow; involucral scales spine-pointed, entire or toothed. Autumn. *l.* oblong, woolly beneath, deeply cut into lance-shaped segments. SYN. *Stobæa pinnata*. (B. M. 1788.)

B. purpurea (purplish).* *fl.-heads* numerous, pedunculate, corymbose, circular, 3in. across, surrounded by an involucre of spreading or reflexed linear oblong bracts. *l.*, lower ones 15in. to 18in. long, 2in. to 2½in. wide, dark green, viscid above, paler and cottony beneath. *h.* 3ft. South Africa. A very handsome, hardy, herbaceous perennial. (G. C. 1872, p. 1261.) SYN. *Stobæa purpurea*.

B. uniflora (one-flowered). *fl.-heads* yellow; scales of involucre spiny toothed. June. *l.* alternate, lanceolate, three-nerved, spiny toothed, downy beneath. *h.* 3ft. Cape of Good Hope, 1815. Greenhouse evergreen. (B. M. 2094.)

BERMUDA CEDAR. *See* **Juniperus bermudiana**.

BERRY. A fleshy fruit, containing seeds.

BERTHOLLETIA (in honour of Louis Claude Berthollet, a celebrated French chemist). Brazil Nut Tree. TRIBE Lecythideæ of ORD. *Myrtaceæ*. *B. excelsa* is a tall tree, having the young branches leafy at the apex. Leaves alternate, oblong, quite entire, rather coriaceous. From this Brazilian species are obtained

the well-known Brazil or Para Nuts of commerce. The tree is of no value for decorative purposes.

BERTOLONIA (named after A. Bertoloni, an Italian botanist, author of "Rariorum Italiæ Plantarum Decades," &c.). ORD. *Melastomaceæ*. Elegant little creeping or dwarf-growing stove plants, chiefly cultivated for their exquisitely marked leaves. Flowers white or purple. Leaves stalked, ovate-cordate, five to eleven-nerved, crenulated; cymes corymbose, terminal. They thrive in a compost of equal parts peat, leaf mould, and sand, in a warm, close, and moist atmosphere, but are most successfully cultivated under a bell glass in the stove; in fact, the latter is the only plan of growing them where a constantly humid atmosphere cannot be otherwise obtained without such means. They are easily propagated by cuttings or seeds.

B. ænea (coppery). *fl.* purple. *h.* 6in. Brazil.

B. guttata (spotted). *See* **Gravesia**.

B. maculata (spotted).* *fl.* violet-purple; peduncles axillary, bearing at the apex a short raceme of six to seven flowers. *l.* on long petioles, cordate, ovate, quite entire, pilose on both surfaces and on the margins, five-nerved. Branches, petioles, peduncles, and calyces hispid from long bristles. Stem rooting at the base. Brazil, 1850. (B. M. 4551.)

B. marmorata (marbled).* *l.* 5in. to 8in. long, ovate-oblong, hairy, five-nerved; upper side vivid bright green, beautifully marked with

irregular streaks of pure white; under surface of a uniform rich purple. Stem fleshy. *h.* 6in. Brazil, 1858.

B. pubescens (downy).* *l.* ovate-acuminate, 3in. to 4in. long, and 2in. to 3in. broad; bright light green, with a broad chocolate-coloured band down the centre; upper surface clothed with long white hairs. Ecuador.

BERZELIA (named in honour of Berzelius, a celebrated Swedish chemist). ORD. *Bruniaceæ*. Very pretty little greenhouse evergreen shrubs. Heads of flowers naked, with three bracts at the base of each; usually crowded at the tops of the branches. Leaves short, somewhat trigonal, imbricate or spreading. They require a mixture of peat, loam, and sand, with thorough drainage and moderately firm potting. Young cuttings root freely in sand, under a bell glass, in gentle heat.

B. abrotanoides (Abrotanum-like). *fl.-heads* white, the size of a filbert, terminal, crowded, sub-corymbose; bracts clavate, green, smooth, ustulate at the apex. May to July. *l.* ovate, ustulate at the apex, smooth, spreading, on short petioles. *h.* 1½ft. Cape of Good Hope, 1787. (L. B. C. 355.)

B. lanuginosa (woolly).* *fl.-heads* white, about the size of a pea, at the tops of lateral branches, disposed in a fastigiate panicle; bracts

spathulate, callose at the apex. June to August. *l.* triquetrous, spreading, callose at the apex, rather hairy. Branches erect, villous when young. *h.* 1ft. to 2ft. Cape of Good Hope, 1774. (L. B. C. 572.)

BESCHORNERIA (in honour of H. Beschorner, a German botanist). ORD. *Amaryllidaceæ*. Greenhouse evergreen succulents, allied to *Littæa* and *Fourcroya*. Perianth deeply six-parted; segments linear spathulate, tubulose-connivent, often spreading at the point; stamens six, about as long as the perianth. For culture, &c., *see* **Agave** and **Aloe**.

B. bracteata (bracteate). *fl.* at first green, turning yellowish-red when mature; panicle 2ft. to 3ft. long; branches many-flowered and corymbose, subtended by large scariose reddish bracts. *l.* in a dense rosette, 12in. to 18in. long, thin, glaucous green with scabrous margin. *h.* 5ft. to 6ft. Mexico. See Fig. 247. (B. M. 6641.)

B. Decosteriana (Decoster's). *fl.* green, tinged with red, pendulous, bracteate; panicle 2ft. to 3ft. long, inclined, with numerous bracts. *l.* numerous, spreading, 18in. to 24in. long, by 1in. to 1½in. broad; edges minutely serrulate. *h.* 8ft. Mexico, about 1880.

B. Tonelii (Tonel's).* *fl.* tubular, 2½in. long, drooping, pedicellate, dark blood-red below and down the

centre, the rest very bright verdigris green; panicle 2ft. long, slender, inclined; bracts several to each fascicle of flowers; scape 4ft. high, red-purple. *l.* few, spreading, 15in. to 20in. long, by 2½in. broad, acuminate and keeled beneath towards the top, minutely serrulate. Mexico, 1872. (B. M. 6091.)



Fig. 247. Beschorneria bracteata.

B. tubiflora (tube-flowered). *fl.* greenish-purple, nutant, fascicled, bracteate; fascicles remote, secund; scapes erect, long, simple. May. *l.* radical, linear, channelled, recurved,

spinosely denticulate. *h.* 6ft. Mexico, 1845. (B. M. 4642.)

B. yuccoides (Yucca-like). *fl.* bright green, pendent, racemose, with rich rosy-red bracts; scapes slender, coral-red, simple. May and June. *l.* radical, thickish, lanceolate, acute, 1ft. to 1½ft. long. *h.* 4ft. Mexico.

BESLERIA (named in honour of Basil Besler, an apothecary at Nuremberg). SYN. *Eriphia*. ORD. *Gesneraceæ*. Very pretty stove sub-shrubs, usually erect, branched. Peduncles axillary, few-flowered. Leaves opposite, petiolate, thickish; nerves and veins very prominent beneath. Stems sub-tetragonal. A light rich earth, or a mixture of sand, loam, and peat, and a moist atmosphere, are necessary for successful cultivation. Beslerias may be increased by cuttings, which root readily in heat.

B. coccinea (scarlet-berried).* *fl.* yellow; peduncles axillary bearing three to six flowers in an umbel at top; bracts two, at the division of the common peduncle, orbicularly cordate, toothed, scarlet. *l.* ovate, glabrous, stiff, a little toothed. Guiana, 1819. Climbing shrub. (A. G. 255.)

B. cristata (crested). *fl.*, corolla yellowish, hairy outside; peduncles axillary, solitary, one-flowered; bracts cordate, toothed, sessile, scarlet. June. *l.* ovate, serrated. Guiana, 1739. Climbing shrub.

B. grandiflora (large-flowered).* *fl.* large, campanulate, spotted with red; peduncles axillary, elongated, many-flowered. *l.* ovate-oblong, acuminated, crenated, densely pilose above, villous beneath, as well as on the branches. *h.* 3ft. Brazil.

B. Imrayi (Imray's). *fl.* rather small, yellow, in axillary whorls. *l.* large, lanceolate, serrate, glabrous. Stems quadrangular. Dominica, 1862. Herbaceous perennial. (B. M. 6341.)

B. incarnata (flesh-coloured-berried).* *fl.*, corollas purplish; tube very long, ventricose; lobes of limb reflexed, roundish, unequal, fringed; peduncles axillary, solitary, one-flowered. *l.* oblong, crenated, tomentose on both surfaces. *h.* 2ft. Guiana, 1820. Herbaceous perennial.

B. violacea (purple-berried). *fl.* purple, small; corolla with a curved tube and spreading limb; peduncles racemosely panicled, terminal. Berry purple, edible. *l.* ovate, acute, quite entire, stiff. Guiana, 1824. Climbing shrub. (A. G. 254.)

BESOM, or **BROOM**. Birch-brooms are best for garden purposes, and are generally used. The most suitable for paved yards are those made of the common Ling (*Calluna vulgaris*). Those made of bass fibres are frequently used on paths, for which they are very suitable, but their expensiveness prevents them being generally employed. Whatever material

is used in its composition, a Besom will last much longer if soaked in water for some time before using.

BESSERA (in honour of Dr. Besser, Professor of Botany at Brody). ORD. *Liliaceæ*. An elegant little half-hardy, Squill-like, bulbous plant, from Mexico. Perianth bell-shaped, six-parted. Leaves narrow, linear. It requires a compost of loam, leaf soil, peat, and sand, with good drainage. If cultivated in pots, a plentiful supply of water must be given from the commencement of growth until ripening off. When at rest, however, it should be kept dry and cool, but secure from the effects of frost. If planted out, a well-drained sunny position must be chosen, such as close to the wall of a greenhouse with a southern aspect. Propagation may be effected by offsets.

> **B. elegans** (elegant).* *fl.* scarlet, or scarlet and white. July to September. *l.* 1ft. to 2ft. long, narrow, furrowed on the upper side. *h.* 2ft. Mexico, 1850. This is the only species. The colour of the flowers varies considerably, on which account other names have originated. (B. R. 25, 34.)

BETA (from *bett*, the Celtic word for red; in reference to the colour of the Beet). Beetroot. ORD. *Chenopodiaceæ*. Perianth single, half-inferior, five-cleft, persistent. Seed one, reniform, imbedded in the fleshy base of the calyx. *B. Cicla* is largely used as a decorative plant in sub-tropical and other styles of gardening. They require the same culture as the ordinary Beet. The other sorts, with dark blood-red leaves, are largely employed in flower gardens, and the roots utilised for culinary purposes. *See also* **Beet.**



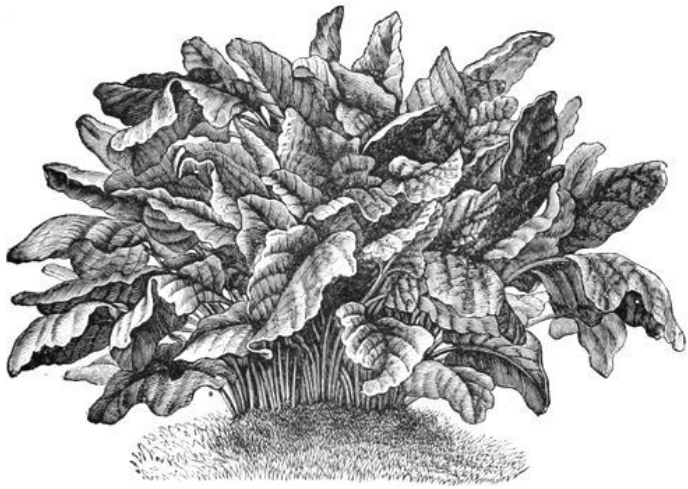


Fig. 248. Beta hortensis metallica, or Victoria Beet.

B. Cicla (Sicilian). *fl.* greenish, disposed in threes. August. *l.* with very thick ribs. Roots scarcely any. *h.* 6ft. Portugal, 1570. The variety, *B. c. variegata*, usually known as the Chilian Beet, is a very handsome plant, having its leaves often more than a yard in length and over 1ft. in diameter, with a remarkably handsome variegation. The midribs are usually dark orange or scarlet. It is a most desirable and effective plant for sub-tropical gardening.

B. hortensis metallica (metallic). Victoria Beet. An ornamental variety with glistening deep blood-red leaves. Useful for decorative purposes in summer, either as a single specimen or in a mass. Roots may also be used for cooking. See

Fig. 248.

B. maritima (sea). *fl.* greenish, disposed in hairs. August. *l.*, lower ones rhomboid-ovoid, acute; upper ones lanceolate. Stem diffuse. Root scarcely any. *h.* 1ft. Britain.

B. vulgaris (common). The Common Beetroot. *fl.* greenish, clustered. August. *l.*, lower ones ovate. Root fleshy. *h.* 4ft. South Europe, 1548.

BETCKEA. *See* **Plectritis**.

BETEL, or **BETLE**. *See* **Piper Betle**.

BETONICA. This genus now forms a sub-division of *Stachys* (which *see*). Betony (*Stachys Betonica*) is a native herb formerly much used in medicine, but now almost entirely discarded.

BETONY. *See* **Stachys Betonica**.

BETULA. (according to some authorities, from *Betu*, its Celtic name; others give the derivation of the word as from *batuo*, to beat, the fasces of the Roman lictors, which were made of Birch rods, being used to drive back the people). Birch. ORD. *Cupuliferæ*. TRIBE *Betuleæ*. Ornamental, hardy (except where otherwise specified), deciduous trees or shrubs, allied to *Alnus*, having round, slender, often drooping branches, and the bark in most species in thin membranous layers. The flowers appear at the same time as the leaves. Male catkins cylindrical, lax, imbricated all round with ternate concave scales, the middle one largest, ovate; corolla none; filaments ten to twelve, shorter than the middle scale, to which they are attached. Female catkins similar, but more dense; scales horizontal, peltate, dilated outwards, three-lobed,

three-flowered; corolla none. Nut oblong, deciduous, winged at each side. The Betulas are easily cultivated in any ordinary soil; but a light sandy loam suits them best. Most of the species are best increased by seeds, which ripen in September, and need to be dried, in order to prevent fermentation. They should be sown in March, in a sandy soil, the surface of which has been previously made perfectly level. They must be spread on the surface, and not covered with soil, but pressed down with the feet. When grown in quantities, beds 4ft. in width are preferred, with an alley of 1ft. between them. In early summer, if the weather be warm and dry, the beds should be shaded with branches. The young seedlings must be transplanted when a year old. The dwarfer kinds may be propagated by layering in the autumn. The numerous beautiful varieties are best increased by grafting or budding upon seedling stocks of the common kinds, the former being done in spring, and the latter in summer when the buds are ready. Those most useful as forest trees and for protection are quick-growing and very ornamental. The time of maturity of the Birch depends very much upon the soil and situation, but it seldom increases in size after it is thirty years old. The common species (*B. alba*) is one of the hardiest and most useful trees in cultivation, growing quickly, and withstanding exposure better than many others; consequently it is invaluable for skirting and nursing more tender subjects, and is especially desirable for clothing mountainous and exposed districts. It is also very beautiful and picturesque. It is the commonest tree throughout Russia, from the Baltic to the Eastern Sea, frequently monopolising gigantic forests. In Italy, it forms excellent forests up to 6000ft. altitude, and in our own Highlands of Scotland it occurs up to

a height of 2500ft. In Greenland, although much reduced in size, it holds its own as the only arboreal vegetation.



Fig. 249. Leaves and Catkin of Betula alba.

B. alba (white).* Silver, White, or Common Birch. *fl.* whitish. February and March. *fr.* brown, ripe in

September and October. *l.* ovate, acute, somewhat deltoid, unequally serrated; autumnal tints rich yellow, scarlet, or red. A diminutive shrub in the extreme north, but a tree from 50ft. to 60ft. high in the middle regions. Britain. A most beautiful and invaluable forest tree, with a large number of varieties. See Fig. 249.

B. a. alba-purpurea (white and purple).* *l.* rich purple above, with a lustrous metallic hue, pale beneath. Branches with a sub-pendulous disposition. A very effective variety.

B. a. dalecarlica (Dalecarlian).* *l.* deeply pinnatifid, with the lobes toothed.

B. a. foliis-variegatis (variegated-leaved).* *l.* blotched with yellowish white.

B. a. laciniata pendula (pendulous and laciniate).* *l.* rather larger than the typical form, deeply laciniated, deep green, and decidedly pendulous. It appears there are two forms of this, but that known as Young's variety is the best.

B. a. macrocarpa (large-fruited).* Female catkins twice as long as those of the type.

B. a. pendula (pendulous).* A well-known tree, distinct from the species in having the shoots more slender,

smoother, and pendulous.

B. a. pontica (pontic). *l.* somewhat larger than in the species, and the plant of more robust growth. (W. D. B. 2, 94.)

B. a. pubescens (downy). *l.* covered with hairs.

B. a. urticifolia (nettle-leaved).* *l.* deeply laciniated, serrated, and hairy. Several others, reputed as distinct, are mere forms of the typical *B. alba*.

B. Bhojpattra (Bhojpattra).* *fl.*, female catkins erect, cylindrical, oblong; bracts smooth, woody, two-parted, blunt, much longer than the fruit, which has narrow wings. May. *l.* oblong-acute, with nearly simple serratures, somewhat cordate at the base; their stalks, veins, and twigs hairy; the bark is of a pale cinnamon colour. *h.* 50ft. Himalayas, 1840. This requires a sheltered position.

B. carpinifolia (Hornbeam-leaved). Synonymous with *B. lenta*.

B. daurica (Daurian).* *fl.*, catkins whitish-brown, larger than those of the common Birch. February and March. *l.* ovate, narrow at the base, quite entire, unequally dentate, glabrous; scales of the strobiles ciliated on their margins; side lobes roundish. *h.* 30ft. to 40ft. Siberia, 1786. The variety *parvifolia* has

smaller leaves than the type.

B. excelsa (tall). Synonymous with *B. lutea*.

B. fruticosa (shrubby).* *fl.* whitish-brown; female catkins oblong. February and March. *l.* roundish-ovate, nearly equally serrated, glabrous. *h.* 5ft. to 6ft. in moist situations, but much higher on mountains. Eastern Siberia, 1818. (W. D. B. 2, 154.)

B. glandulosa (glandular).* *fl.* whitish; female catkins oblong. May. *l.* obovate, serrate, quite entire at the base, glabrous, almost sessile; branches beset with glandular dots, glabrous. *h.* 2ft. Canada, 1816. A handsome little shrub. (F. D. 2583.)

B. lenta (pliant). *fl.* greenish-white. May to June. *l.* cordate, ovate, acutely serrated, acuminate; petioles and nerves hairy beneath; scales of the strobiles smooth, having the side lobes obtuse, equal, with prominent veins. *h.* 60ft. to 70ft. Canada to Georgia, 1759. SYN. *B. carpinifolia*. (W. D. B. 2, 144.)

B. lutea (yellow).* *fl.* greenish-white. May. *l.* 3½in. long, and 2½in. broad, ovate, acute, serrated; petioles pubescent, shorter than the peduncles; young shoots and leaves, at their unfolding, downy, but ultimately quite glabrous, except the

petiole, which remains covered with fine short hairs; scales of the strobiles having the side lobes roundish. *h.* 70ft. to 80ft. Nova Scotia, 1767. SYN. *B. excelsa*.

B. nana (dwarf).* *fl.* whitish-green; catkins erect, stalked, cylindrical, obtuse; the barren ones lateral, and the fertile ones terminal; scales of the latter three-lobed, three-flowered, permanent. April and May. *l.* orbicular, crenate, reticulated with veins beneath. *h.* 1ft. to 3ft. Scotland, Lapland, Sweden, Russia, &c. A shrub with numerous branches, slightly downy when young, and beset with numerous little, round, firm, smooth, sharply crenated leaves, beautifully reticulated with veins, especially beneath; and furnished with short footstalks, having a pair of brown lanceolate stipules at their base. There is also a pretty variety named *pendula*, with drooping branches.

B. nigra (black).* The Black Birch. *fl.* greenish-white; female catkins straight, and nearly cylindrical, about 2in. long. May. *l.* rhomboid-ovate, doubly serrated, acute, pubescent beneath, entire at the base; scales of the strobiles villose; segments linear, equal. *h.* 60ft. to 70ft. New Jersey to Carolina, 1736. SYN. *B. rubra*. (W. D. B. 2, 153.)

B. papyracea (papery).* *fl.* greenish-white; female catkins on long footstalks, drooping; scales having the side lobes short, somewhat orbiculate. May to June. *l.* ovate, acuminate, doubly serrate; veins hairy beneath; petiole glabrous; the branches are much less flexible than those of the common Birch, and are more ascending. *h.* 60ft. to 70ft. North America, 1750. (W. D. B. 2, 152.)

B. p. fusca (brown). *l.* smaller than those of the type, and less downy.

B. p. platyphylla (broad-leaved).* *l.* very broad.

B. p. trichoclada (hairy-branched).* *l.* cordate. Branches extremely hairy, and twigs in threes.

B. populifolia (Poplar-leaved).* *fl.* greenish-white. April, May. *l.* deltoid, much acuminated, unequally serrated, quite smooth; scales of the strobiles having roundish side lobes; petioles glabrous. *h.* 30ft. Canada, 1750. This species, although very closely resembling *B. alba*, grows with less vigour, and does not attain so large a size. (W. D. B. 2, 151.)

B. p. laciniata (laciniated).* *l.* large, shining, and deeply cut.

B. p. pendula (pendulous).* Spray drooping, like that of *B. alba*

pendula.

B. pumila (dwarf).* *fl.* whitish; female catkins cylindrical. May and June. *l.* roundish ovate, on long footstalks, densely clothed with hairs on the under surface. Branches pubescent, dotless. *h.* 2ft. to 3ft. Canada, 1762. A very beautiful kind, suitable for furnishing large rockeries, or planting on hill sides, or rocky ground. (W. D. B. 2, 97.)

B. rubra (red).* Synonymous with *B. nigra*.

BETULEÆ. A tribe of deciduous shrubs or trees. Perianth none, or bract-like; flowers monœcious, in catkins, in twos or threes. Fruit, a dry, compressed, lenticular, often winged, indehiscent nut. Leaves alternate, simple, stipulated. The genera are *Alnus* and *Betula*.

BI. In compound words, this signifies twice.

BIANCEA SCANDENS. *See* **Cæsalpinia sepiaria.**

BIARUM (an ancient name of a plant). ORD. *Aroideæ*. A genus of small, hardy, tuberous-rooted perennials, much more curious than pretty, allied to *Sauromatum*. This genus, according to Dr. Masters, differs from *Arum* in its spathe being tubular at the base, with the limb spreading. The female flowers have a distinct style, and the fruit contains only one ovule. They will thrive in any light, rich, well-drained soil, and may otherwise be treated similar to the hardy *Arums*. There are several other species besides those named, but they are not yet in general cultivation.

B. constrictum (constricted). A synonym of *B. tenuifolium*.

B. gramineum (grassy). A synonym of *B. tenuifolium*.

B. tenuifolium (slender-leaved).* *fl.*, spathe dark brown-purple, reflexed in the upper part; spadix very long, subuliform. June. *l.* linear-lanceolate. *h.* 6in. South Europe, 1570. SYNS. *B. gramineum* and *B. constrictum*. (B. R. 512, under name of *Arum tenuifolium*.)

BIAURICULATE. Having two auricles.

BIBRACTEATE. Furnished with two bracts.

BIBRACTEOLATE. Furnished with two secondary bracts.

BICARINATE. Two-keeled.

BICOLOR. Two-coloured.

BICONJUGATE. Having two secondary petioles, each with a pair of leaflets.

BICORNUTE. With two horn-like processes.

BIDENS (from *bis*, twice, and *dens* a tooth; in reference to the seed). Bur Marigold. ORD. *Compositæ*. A rather large genus of mostly hardy annual and perennial herbs, distinguished by the pericarp having from two to four rigid awns, which are rough with minute deflexed points. Involucre erect, of several oblong, nearly equal, parallel scales. Most of the species of this genus are of no merit as garden plants. Two are natives of Britain, viz., *B. cernua* and *B. tripartita*. They thrive in any ordinary garden soil. Propagated by divisions of the plant; or

by seeds.

B. atro-sanguinea (dark-bloody). *fl.-heads* black-crimson, very freely produced. Late summer and autumn. Leaves pinnate. Root tuberous. *h.* 3ft. Mexico. (B. M. 5227.)

B. ferulæfolia (Ferula-leaved). *fl.-heads* yellow. Autumn. *l.* bipinnatifid. *h.* 2ft. Mexico, 1799. SYN. *Coreopsis ferulæfolia*. (B. M. 2059.)

B. procera (tall). *fl.-heads* yellow, large. *l.* finely divided, deep green. A handsome perennial. *h.* 6ft. to 8ft. Mexico, 1820. (B. R. 684.)

B. striata (striped). *fl.-heads* rather large, in a panicled leafy corymb; ray florets white; disk yellow. *l.* ternately pinnated, glabrous. *h.* 2ft. to 3ft. Autumn. Mexico. (B. M. 3155.)

BIDENTATE. With two teeth.

BIEBERSTEINIA (named after Frederic Marschall Bieberstein, a Russian naturalist, author of "Flora Taurico-Caucasica," and other works). ORD. *Rutaceæ*. A genus of half-hardy herbaceous perennials. They thrive in a compost of loam, peat, and sand. Propagated by cuttings, placed under a hand glass in early summer; or by seeds, sown in a slight hotbed in March or April.

B. odora (sweet). *fl.* yellow; racemes terminal, simple; petals entire. May.

l. impari-pinnate; leaflets roundish, deeply toothed. Plant beset with glandular hairs. *h.* 1ft. Altaia, 1837.

BIENNIAL. A term applied to plants occupying two years in the development from seed to the maturation of seed: growing one year, flowering, fruiting, and dying the next. Seeds of Hardy Biennials are, as a rule, sown from June to August, to flower the succeeding season. Tender varieties are sown in a frame or cool house, and kept there all winter, being transferred from the frames or houses to the open border, in June. Wallflowers, Foxgloves, Canterbury Bells, and Sweet Williams, may be taken as fair types of Biennials, although they often assume more than a Biennial character on light sandy soils.

BIFARIOUS. Two-ranked; arranged in two opposite rows.

BIFID. Divided about half-way down into two parts; two-cleft.

BIFOLIATE. Compound leaves with two leaflets.

BIFRENARIA (from *bis*, twice, and *frænum*, a strap; in reference to a double strap or band, by means of which the pollen masses are connected with their gland). ORD. *Orchideæ*. A genus of pretty stove orchids, allied to *Maxillaria*, and distinguished from it by having two fræna or caudicles to their pollen masses. For culture, *see* **Maxillaria**.

B. aurantiaca (orange-coloured).* *fl.* orange; lateral lobes of lip semi-cordate, middle one transverse, sub-undulated, callous at the base; raceme erect. October. *l.* oblong, plicate. Pseudo-bulb roundish,

compressed, two-leaved. *h.* 9in. Demerara, 1834. (B. R. 1875.)

B. aureo-fulva (orange-tawny). *fl.* orange, on long pedicels; lip unguiculate, three-lobed; scape radical, many-flowered. October. *l.* oblong-lanceolate. Pseudo-bulb roundish-ovate, wrinkled, one-leaved. *h.* 1ft. Brazil, 1840.

B. Hadwenii (Hadwen's). *fl.* each nearly 4in. across; petals and sepals ½in. broad, yellow green, beautifully blotched or mottled with a rich brown; lip large, above 1in. broad, white, with striped spots of rose. June. *l.* long, ¼in. broad. *h.* 1½in. Brazil, 1851. SYN. *Scuticaria Hadwenii.* (B. M. 4629.)

B. H. bella (charming).* A new variety with sepals and petals whitish yellow outside, brilliant shining cinnamon inside, with a few spots, bars, and blotches of whitish sulphur colour; lip wide, white, with one light brown spot behind, and a larger one in front of the callus; radiating light brown lines on lateral lobes, and mauve ones on anterior lobe.

B. H. pardalina (leopard-marked).* A very beautiful variety, having sepals and petals with brown circles or polygonal figures on a light yellow ground; lip light ochre-coloured at its basilar part, white in

front, with radiating mauve-purple streaks. This variety is extremely rare.

B. vitellina (yolk-coloured).* *fl.* yellowish purple; lip cuneate, three-lobed; lateral lobes acute, crenulated; racemes drooping. July. *l.* lanceolate. Pseudo-bulb ovate, bluntly angular, one-leaved. *h.* 1ft. Brazil, 1838.

BIFURCATE. Twice-forked.

BIGELOVIA (named after Dr. Jacob Bigelow, author of "Florula Bostoniensis," &c.). ORD. *Compositæ*. A genus of hardy shrubs, sub-shrubs, or herbaceous plants, as now understood, comprising several subjects formerly referred to *Chrysothamnus*, *Linosyris*, &c. Flower-heads disposed in corymbs; involucre imbricated, oblong, or campanulate; receptacle flat. Leaves alternate, linear or lanceolate. They thrive in any ordinary garden soil. Propagated by cuttings.

B. Howardii (Howard's). *fl.-heads* yellow; involucre narrow. A low shrub. SYN. *Linosyris Howardii*.

B. nudata (naked). *fl.-heads* yellow. September. *l.* scattered, oblanceolate or linear. *h.* 1ft. to 2ft. New Jersey. Perennial.

B. paniculata (panicled). *fl.-heads* yellow, barely ½in. long, loosely panicled, five-flowered. California. Shrubby.

BIGEMINATE. Doubly paired.

BIGLANDULARIA. *See* **Sinningia**.

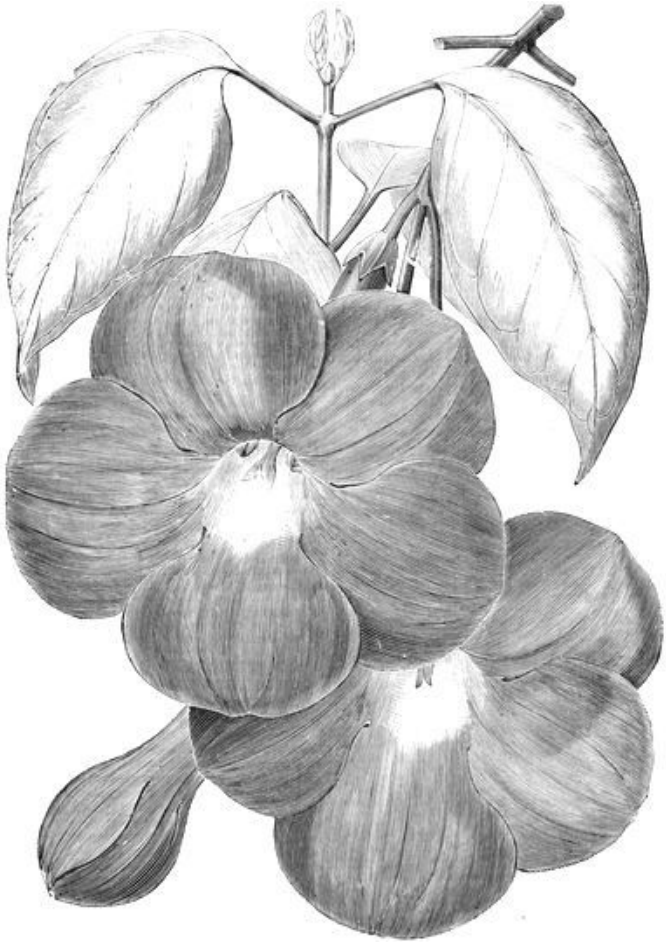


Fig. 250. Branch and Flowers of Bignonia magnifica.

BIGNONIA (so named by Tournefort, in compliment to the Abbé Bignon, librarian to Louis IV.). Ord. *Bignoniaceæ*. A large genus of usually scandent shrubs, furnished with tendrils; rarely erect trees or shrubs. Flowers axillary and terminal, usually

panicled; corolla with a short tube, a campanulate throat, and a five-lobed, bilabiate limb. Leaves opposite, simple, conjugate, ternate, digitate or pinnatifid. These handsome plants are particularly suited for large houses, where, if well grown, they give great satisfaction. The primary point in their culture is to obtain free and, at the same time, sturdy growth, giving due attention to training, pruning, &c., or the plants soon exceed all limits. Like all free-growing plants, Bignonias thrive best planted out in the borders of the stove or greenhouse, or out of doors, as the case may be; but the space allowed should be limited, in order to restrict root production. They may either be trained to cover the back wall, or be planted in a border in front, and trained up the rafters, or on wires, arranged where most desirable. In summer, allow all the strongest shoots to grow, training them so as to have as much sunlight as possible—which is absolutely necessary to well ripen the wood, and make it capable of producing flowers—without entirely shutting it out from the plants below. Soil: A compost of two part fibrous loam, one part peat, one of leaf mould, and a due proportion of sand, will be found most satisfactory. The loam and peat should be used in a rough state, unsifted, as this will keep the border open for some years, and thorough drainage should be effected. Propagation: Seed being rarely procurable, the most satisfactory method of propagation is by cuttings, made of good strong shoots, in early spring. Three joints are sufficient to make a cutting, if short-jointed; if long-jointed, two are sufficient. Place them in a well-drained pot of sandy soil, under a bell glass, in bottom heat. As these cuttings are young and fleshy, they are liable to damp off; hence it is necessary, for the first two or

three weeks, to wipe the moisture from the glasses every morning, and water sparingly. If well managed, they will root in about two months, and should then have the glasses left off every night for a week; they should then be transferred to small pots in the compost above described, passing it through a coarse sieve, to extract the stones and rough pieces of soil. After potting, the plants should be kept close for a short time, till they are able to bear full exposure to the light. In a year's time, they will be large enough to plant out in their permanent quarters. Bignonias may also be increased by layering.

B. æquinoxialis (equinoxial). *fl.* yellow; peduncles two-flowered, terminal ones racemose. June to October. *l.* glabrous, conjugate; leaflets oblong-lanceolate. Tendrils simple, axillary. Cayenne, 1768.

B. æ. Chamberlaynii (Chamberlayn's).* *fl.*, corolla yellow, funnel-shaped; segments obtuse; racemes axillary, six to eight-flowered. April to October, *l.*, leaflets ovate, acuminated, glabrous, shining above. Tendrils strong, simple. Brazil, 1820. (B. R. 741.)

B. æsculifolia (Chestnut-leaved). A synonym of *Tabebiua æsculifolia*.

B. apurensis (Apuran). *fl.* pedicellate, 2in. long; corolla yellow, funnel-shaped, with roundish, spreading, nearly equal lobes; spikes terminal, sessile. *l.* ternate; leaflets

elliptic-oblong, short-acuminated, acutish at the base. Shady banks of the river Apures, near El Diamante, 1824.

B. argyreo-violascens (silvery-violet). *l.* white-veined, in a young state violet. South America, 1865. (F. M. 1865, 26.)

B. aurantiaca (orange). *fl.* orange-coloured. South America, 1874.

B. capreolata (tendrilled).* *fl.*, corolla orange; peduncles axillary, one-flowered, crowded. April to August. *l.* conjugate; leaflets cordate oblong; lower ones simple. Tendrils small, trifid. North America, 1710. Hardy in south of England. (B. M. 864.)

B. c. atro-sanguinea (dark blood-red). *fl.* red-purple. Summer. United States. (B. M. 6501.)

B. Cherere (Chirere).* *fl.*, corollas orange, 2in. long; cymes axillary. June to November. *l.*, lower ones ternate, upper ones conjugate, cirrhose; leaflets ovate, acuminated, sometimes sub-cordate, glabrous. Guiana (in woods and on the banks of rivers), 1824. (B. R. 1301.)

B. Chica (Chica). *fl.*, corolla funnel-shaped, violaceous; limb with nearly equal, rounded segments; panicles axillary, pendulous. *l.* 8in. to 10in. long, abruptly bipinnate; leaflets

conjugate, elliptic-ovate, acuminated, deeply cordate, glabrous. Tendrils simple. Banks of the Orinoco, 1819.

B. chrysantha (yellow-flowered). *fl.* terminal, crowded; corolla yellow, 2in. long. May. *l.*, leaflets five, ovate, acuminated, tomentose, on pedicels 5in. long. *h.* 12ft. to 26ft. Caraccas, 1823. Tree.

B. chrysoleuca (yellowish-white). *fl.*, corolla yellow, with a white limb, glabrous, 1½in. long; peduncles three to five-flowered. June, July. *l.* conjugate; leaflets 5in. to 6in. long, 2in. broad, oblong acuminated, glabrous, rounded at the base, shining. Tendrils undivided. Banks of the River Magdalena, 1824.

B. Clematis (Clematis-like).* *fl.*, corolla white, yellowish inside; lobes nearly equal, roundish, red; panicles axillary, downy. *l.* 7in. to 8in. long, conjugately pinnate, with an odd one; leaflets 2in. long, 1in. broad, ovate, narrowed at top, acute, cordate at the base, glabrous. Branches quadrangular, glabrous. Caraccas, 1820.

B. diversifolia (diverse-leaved). *fl.*, corolla yellow, campanulately funnel-shaped; panicles terminal. *l.* conjugate and simple; leaflets roundish-ovate, acuminated, sub-cordate, glabrous, shining. Tendrils

undivided. Branches quadrangular, striated. Mexico, 1825.

B. floribunda (many-flowered).* *fl.*, corolla purplish, funnel-shaped, eight lines long; panicles axillary, powdery, with opposite branches and dichotomous branchlets. *l.* conjugate; leaflets 2½in. long, oblong-elliptic, acuminated, acute at the base, glabrous, shining. Tendrils undivided. Branches beset with white warts and fine powder. Mexico, 1824.

B. lactiflora (milk-flowered). *fl.*, corolla milk white, 1½in. long, villously tomentose on the outside; racemes twin, with a petiolate bract at the base of each pedicel. April and July. *l.* conjugate; leaflets 2in. long, cordate, ovate, glabrous. Branches striated. Tendrils trifid. Santa Cruz, 1823.

B. leucoxyla (white-wooded). A synonym of *Tabebiua leucoxyla*.

B. litoralis (shore). *fl.*, corolla funnel-shaped, red, downy outside; panicles axillary, dichotomously branched. May to July. *l.* ternate; leaflets roundish-ovate, acuminated, clothed with soft hair on both surfaces. Branches terete, glabrous; branchlets hairy. Mexico, 1824.

B. magnifica (magnificent).* *fl.* varying from delicate mauve to rich

purplish-crimson; throat light primrose colour, very large, 3½in. across; panicles large, branching. Summer. *l.* opposite, on rather long petioles, broadly ovate. Columbia, 1879. A very handsome species. See Fig. 250, for which we are indebted to Mr. Bull.

B. mollis (soft). *fl.* small, downy; panicle terminal, many-flowered. *l.* trifoliate; leaflets 5in. long, ovate, sub-cordate, downy on both surfaces. Cayenne, 1818.

B. molissima (very soft). *fl.*, corollas somewhat funnel-shaped, downy inside; panicles axillary, dichotomously branched, downy. *l.* conjugate and simple; leaflets 2½in. long, 1½in. broad, ovate, acute, cordate, clothed with soft hairs above. Caraccas, 1820.

B. pallida (pale).* *fl.* axillary, usually solitary; corolla 2in. long, funnel-shaped, with a yellow tube, and a pale lilac limb; lobes crenately ciliated. July. *l.* simple, opposite, oblong, obtuse, rather cordate at the base. Branches terete. St. Vincent, 1823. (B. R. 965.)

B. picta (painted). A synonym of *B. speciosa*.

B. radicans (rooting). *See* **Tecoma radicans**.

B. reticulata (netted). Columbia,

1873.

B. Roezlii (Roezl's). Columbia, 1870.

B. SALICIFOLIA (Willow-leaved). *fl.*, corolla funnel-shaped, 1½in. long, copper-coloured, with a white limb; peduncles axillary, three to six-flowered, downy. Summer. *l.* conjugate; leaflets lanceolate, 3in. long, acute at both ends, quite glabrous, shining. Branches terete, sulcate. Trinidad, 1824.

B. speciosa (beautiful).* *fl.* pink, stained with purple; calyx spathaceous, split on one side; panicles terminal. May. *l.* pinnate, ternate and verticillate; leaflets oblong-lanceolate, acuminate, shining, serrate. *h.* 4ft. Uruguay, 1840. A glabrous evergreen shrub. SYN. *B. picta.* (B. M. 3888.)

B. spectabilis (showy). *fl.*, corolla 3in. long, rather coriaceous, glabrous, purple; racemes terminal, short, having the two lower pedicels three-flowered, and the rest one-flowered. *l.* conjugate; leaflets ovate-oblong, acuminated, obtuse. Santa Cruz, &c., 1820.

B. Tweediana (Tweedie's). *fl.* yellow; corolla glabrous, limb deeply five-parted, ciliated; segments emarginate; peduncles one-flowered. Summer. *l.* conjugate; leaflets

lanceolate, acuminate; petioles downy. Buenos Ayres, 1838. (B. R. 26, 45.)

B. variabilis (variable).* *fl.*, corolla 3in. long, with a greenish-yellow tube; limb ultimately white; racemes simple, short, many-flowered, terminal. June to August. *l.*, lower ones biternate; superior ones conjugate; divisions ternate. Branches tetragonal. Tendrils trifid. Caraccas, 1819.

B. venusta (lovely). *fl.*, corolla crimson, clavately funnel-shaped, with a spreading border, villous inside; corymbs terminal, many-flowered. August to December. *l.*, lower ones ternate; superior ones conjugate; leaflets oblong-ovate, acuminated oblique at the base. Brazil, 1816. (B. R. 249.)

BIGNONIACEÆ. A large order of trees, or twining or climbing shrubby plants. Flowers usually trumpet-shaped; corolla usually irregular, four or five-lobed, and with a swollen portion below its mouth; stamens five, unequal. Fruit, a two-valved, often pod-like capsule. Leaves usually opposite, compound. The best-known genera are *Bignonia*, *Catalpa*, *Eccremocarpus*, *Jacaranda*, and *Tecoma*.

BIJUGATE. A compound leaf, with two pairs of leaflets.

BILABIATE. Having two lips.

BILBERRY. *See* **Vaccinium Myrtillus**.

BILIMBI TREE. *See* **Averrhoa Bilimbi.**

BILL. A cutting instrument, curved forward, or hook-shaped toward the point, and fitted with a handle, like a hatchet. It is used for pruning, &c. When short, it is called a Hand-bill; when long, a Hedge-bill, or Hedge-hook.

BILLARDIERA (in honour of Jacques Julien Labillardiere, a celebrated French botanist and traveller). Apple Berry. ORD. *Pittosporaceæ*. Very desirable greenhouse evergreen climbers. Peduncles solitary from the apex of the branches, one-flowered, pendulous; calyx of five subulate sepals; petals five, combined into a tube below, generally yellow; stamens five. Fruit edible. Leaves alternate. They thrive either in pots or planted out in a compost of fibrous loam, leaf soil, and peat, in equal proportions, with thorough drainage. Cuttings, dibbled in a pot of sandy soil, placed under a bell glass, in gentle heat, root readily. They may also be raised from seed, which several of the species produce in abundance.

B. angustifolia (narrow-leaved). A synonym of *B. scandens*.

B. longiflora (long-flowered).* *fl.* greenish-yellow, often changing to purple, solitary; pedicels glabrous. Berries blue. May to August. *l.* lanceolate, entire. Van Diemen's Land, 1810. A very free-growing and profuse-flowering species. SYN. *B. ovalis*. See Fig. 251. (B. M. 1507.)



FIG. 251. FRUITING PORTION OF BILLARDIERA LONGIFLORA.

B. mutabilis (changeable). A synonym of *B. scandens*.

B. ovalis (oval-leaved). A synonym of *B. longiflora*.

B. scandens (climbing).* *fl.* cream-coloured, at length purplish, solitary; pedicels same length as the flower. June to September. *l.* lanceolate-

linear, entire. Branches, when young, villous. New Holland, 1795. SYNS. *B. mutabilis*, *B. angustifolia*. (B. M. 1313.)

BILLBERGIA (named after J. G. Billberg, a Swedish botanist). ORD. *Bromeliaceæ*. A genus of handsome stove plants. Flowers borne on light panicles; calyx three-parted; corolla of three convolute petals, scaly at the base; stamens inserted into the base of the perianth. Leaves harsh, rigid. These require much the same treatment as recommended for *Æchmea*. The most suitable soil is a mixture of peat, leaf soil, and loam in about equal parts, to which is added some sharp sand, to keep it open and porous. Free and perfect drainage is absolutely necessary for the successful culture of this class of plants, and a layer of moss should be placed over the crocks previous to filling the pots with soil. Although fond of heat, Billbergias will, when in flower, bear removal to a cooler house than a stove; and, if they are kept a little dry at the same time, the change will greatly prolong their blooming period. The stronger growing kinds thrive well in rich, well-drained loam and leaf mould. Propagation is effected by carefully taking off the suckers which form at the base, after the plants have done flowering; but, before doing this, they should be allowed to attain a good size. The suckers grow quickly when attached to the parent stem, from which they derive their strength, and feel the check less when severed; besides which, they become more mature, and are in better condition for rooting. The best method to adopt is as follows: Take the sucker in the hand and gently twist it off the stem; next trim the base by the removal of a few of the lower leaves, and then insert each sucker separately in a small pot,

in sharp soil. A bottom heat of about 80deg. will greatly facilitate new root-growth; failing this, they will root freely in the temperature of a stove if placed in a shaded position for two or three weeks, after which they will bear increased light and sunshine during the later part of the day. *See also* **Æchmea** and **Androlepis**.

B. amœna (pleasing). *fl.* greenish-white, tipped with blue, loosely panicled; bracts rose-coloured. July to winter. *l.* ligulate, abruptly acuminate, slightly spiny. *h.* 2ft. Brazil, 1817. (B. R. 344.)

B. Baraquiniana (Baraquin's).* *fl.* green; spikes long, the upper portion pendulous, bearing four or five large, oblong-lanceolate, bright scarlet bracts at the base of the flowers; the stem above the bracts is hoary white. Early spring. *l.* ligulate, tapering to a point, where, as well as at the edges, they are armed with sharp reddish spines, arched, transversely variegated with white scurfy bars. *h.* 1½ft. Brazil, 1865. (I. H. 1864, 421.)

B. chlorosticta (green-spotted). Synonymous with *B. Saundersii*.

B. iridifolia (Iris-leaved).* *fl.* red and yellow, tipped with blue, in drooping spikes; rachis and bracts crimson. March. *l.* lanceolate, ensiform, 1½ft., grey beneath. *h.* 1ft. Rio de Janeiro, 1825. (B. R. 1068.)

B. Liboniana (Libon's).* *fl.*, outer perianth segments beautiful coral red, about half as long as the inner ones, which are whitish at the base, and a splendid purple upwards. Winter. *l.* in a dense rosette. *h.* 1ft. Brazil, 1858. (B. M. 5090.)

B. Lietzei (Lietz's).* *fl.* in loose terminal racemes, each subtended by lanceolate pink bracts; sepals rosy pink, half as long as the greenish corolla. *l.* tufted, ligulate, acute; margin spiny. Brazil, 1881. A double-flowered variety, with petaloid stamens, is mentioned by M. Morren, which is interesting in being the first double-flowered Bromeliad yet recorded. (B. H. 1881, 97.)

B. marmorata (marbled).* *fl.* deep blue; calyces green, tipped with blue; bracts very large, leafy, oblong, bright scarlet; panicles erect, branched, much longer than the leaves. *l.* broadly ligulate, sheathing at the base, truncate-mucronate at the apex; edges very regularly toothed, deep green, freely blotched and barred with dull reddish-brown. (I. H. 2, 48.)

B. Moreli (Morel's).* *fl.*, sepals red, densely woolly, less than half as long as the purplish-violet petals; spike dense, drooping; bracts large, deep rosy red, much longer than the

solitary sessile flowers. February. *l.* arching, lanceolate, shining green on both surfaces; marginal spines few and weak, *h.* 1ft. Brazil, 1848. An excellent basket plant. SYN. *B. Moreliana*. (B. H. 1873, 1, 2.)

B. Moreliana (Morel's). Synonymous with *B. Moreli*.

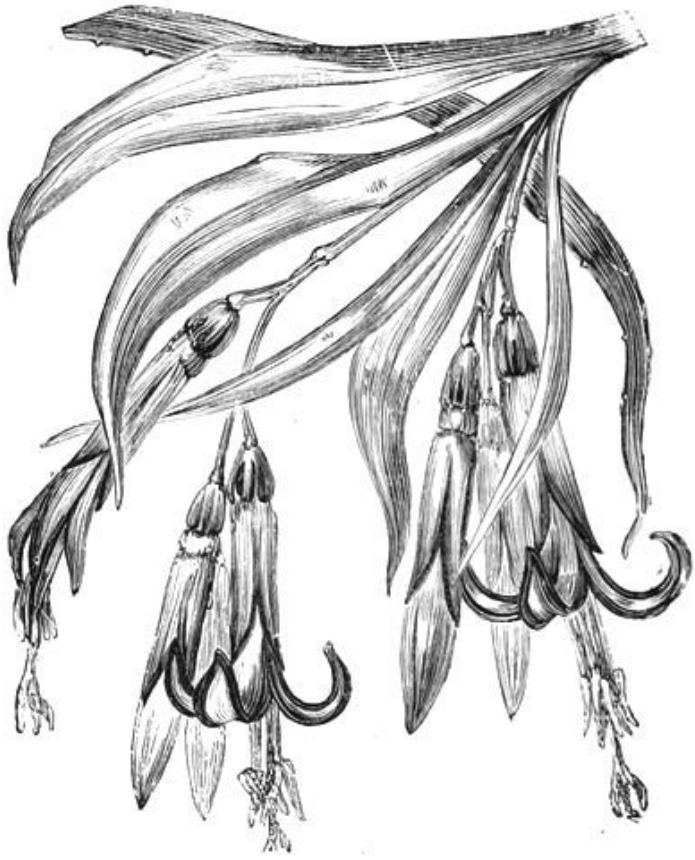


FIG. 252. FLOWERS OF BILLBERGIA NUTANS.

B. nutans (nodding). *fl.*, sepals

reddish; petals yellowish-green, both with a blue margin; scapes slender, nodding, with a few large rosy bracts, terminating in a short drooping spike. Winter. *l.* numerous, long, narrow, ensiform, remotely spiny. *h.* 1½ft. Brazil, 1868. See Fig. 252. (B. M. 6423.)

B. pallescens (pallid). *fl.* greenish-white; ovary deeply grooved; spike pendulous; bracts lanceolate, of a beautiful rose-pink. Winter. *l.* dark green, and spotted on the upper surface, paler beneath, with transverse bars. *h.* 1½ft. Brazil, 1856. SYNS. *B. pallida* and *B. Wioti*.

B. pallida (pale). Synonymous with *B. pallescens*.

B. pyramidalis (pyramidal). *fl.* red, with purple margin, in erect spikes; bracts lanceolate, rosy. February. *l.* curved, ligulate-lanceolate, with white bands beneath. *h.* 1ft. Peru, 1822. (B. H. 1873, 16.)

B. Quesneliana (Quesnel's).* *fl.* deep purple; bracts flesh-coloured; upper ones variegated with white. *h.* 6ft. Guiana, 1874. An erect growing species, possessing the same habit as *B. rosea-marginata*, but having the leaves more acuminate, and deep green in colour. SYN. *Quesnelia rufa*. (F. d. S. 10, 1026.)

B. rosea-marginata (rose-

margined).* *fl.*, inflorescence a dense oblong spike of light blue, subtended by large, broad, deep, rose-coloured bracts, with scarious margins. January. *l.* sheathing at the base, about 2ft. long, channelled, spiny on the margin, and marked with transverse mealy bands. *h.* 1½ft. Tropical America, 1880. SYNS. *B. rubro-marginata* and *Quesnelia roseo-marginata*.

B. rubro-marginata (red-margined). Synonymous with *B. rosea-marginata*.

B. Saundersii (Saunders').* *fl.* about 2in. long, disposed in a loose pendulous inflorescence; sepals crimson, half the length of the petals, which are yellow outside and blue within. *l.* tufted, ligulate, rounded at the apex, terminated by a short mucro, saw-toothed, green above, purple beneath, and spotted white on both surfaces. Brazil, 1868. SYN. (according to Morren) *B. chlorosticta*. (F. M. n. s. 106.)

B. thyrsoidea (thyrsoid). *fl.* dense, in thyrsoid spikes, almost without bracts. June. *l.* green, ligulate, shortly acuminate, the margin toothed. *h.* 1ft. Brazil, 1850. (B. M. 4756.)

B. vittata (striped). *fl.* indigo blue, with crimson calyces and bracts; racemes nodding. *l.* banded, ligulate, elongate, shining. *h.* 1½ft. Brazil,

1843. (B. H. 1871, 14, 15.)

B. Wioti (Wiot's). Synonymous with *B. pallescens*

B. zebrina (zebra-streaked).* *fl.* greenish; scape clothed with large, pale, salmon-coloured bracts; inflorescence gracefully curved downwards. Early spring. *l.* sheathing for about half their length, forming thus a sort of tube, deep green, with zones of grey, the whole deepening with age. *h.* 1½ft. South America, 1826. SYN. *Helicodea zebrina*. (L. B. C. 1912.)

BILOBATE. Two-lobed.

BINATE. In pairs.

BINDING. The process of securing a graft or bud in its place by means of Raffia or Bast. The same term is applied to hard clay or other soil impervious to water, in summer.

BINDWEED. *See* **Convolvulus**.

BIOPHYTUM (from *bios*, life, and *phyton*, a plant; the leaves of one species being sensitive to the touch). TRIBE *Oxalideæ* of order *Geraniaceæ*. A genus of pretty and interesting perennials, differing from *Oxalis*, in which genus it has been included, in the valves of the capsule being patent and separate to the base. They will thrive in a mixture of loam and peat. Propagated by seeds, which should be sown in spring, on a hotbed. Probably the only species in cultivation is the following:

B. sensitivum (sensitive). *fl.* yellow,

small. July. *l.*, leaflets oblong, obtuse, mucronate. *h.* 6in. India and China, 1823. The leaves of this plant contract on the slightest touch. SYN. *Oxalis sensitiva*. (B. R. 31, 68.)

BIOTA. *See* **Thuja**.

BIOTIA. *See* **Aster corymbosus.**

BIPARTITE. Divided into two nearly to the base.

BIPINNATE. Twice pinnate.

BIPINNATIFID, or **BIPINNATIPARTED**. Having both primary and secondary segments of a leaf divided, but not to the base.

BIPLICATE. Having two folds or plaits.

BIRCH. *See* **Betula.**

BIRD-CHERRY. *See* **Cerasus Padus**.

BIRDLIME. A preparation made from Mistletoe berries and Holly bark. It is used for catching birds.

BIRD-PEPPER. *See* **Capsicum baccatum.**

BIRDS. As a class, Birds are very much more useful than hurtful in gardens. Owls are of great use in catching mice, and Night-jars in catching night-flying insects. Rooks are very useful in lessening the numbers of wire-worms, and of hurtful insects in general; but, if very numerous, they may be driven to eat potatoes and other vegetable food, and may then do harm. The same may be said of Starlings. Blackbirds and Thrushes feed much on snails and worms, but they also feed on the ripe fruits in gardens. As a rule, slender-billed birds feed almost wholly on insects or other animals, and are to be encouraged in gardens at all seasons. Among these

may be enumerated the Tree-creeper, Wryneck, Warblers, and Wrens of various kinds, Chats, Hedge-sparrow, Larks, Redstart, Robin, Titmice, and Wagtails. Swifts, Swallows, and Martins, are also great destroyers of insects. The Finches feed, in part, on insects, but also eat large quantities of seeds, and often do considerable damage among plants grown for seed, *e.g.*, Cabbages, and in the seed-beds. Sparrows are about the most troublesome, though they are often assisted by Buntings, Chaffinches, Linnets, and others. When seed-beds or fruits have to be protected, this may be done by nets; or, more simply, by threads tied to sticks a few inches above the surface of the ground, or in front of the trees.

BIRD'S-EYE PRIMROSE. *See* **Primula farinosa**.

BIRD'S-FOOT. *See* **Ornithopus**.

BIRD'S-FOOT FERN. *See* **Pellæa ornithopus**.

BIRD'S-NEST FERN. *See* **Asplenium Nidus.**

BIRTHWORT. *See* **Aristolochia.**

BISCUTELLA (from *bis*, double, and *scutella*, a saucer; in allusion to the form of the silicles). Buckler Mustard. ORD. *Cruciferæ*. Perennial or annual herbaceous plants, usually hispid, but sometimes downy or smoothish. Flowers yellow, scentless; pedicels filiform, bractless. Leaves oblong, entire, toothed or pinnatifid, somewhat radical or cauline. Stems round, erect, usually corymbosely branched at the top by racemes, which, when in flower, are short, but elongated at the time of fruiting. All the species produce seeds freely. The annuals should be sown in the open borders. Some of the perennial kinds are well adapted for ornamenting rockwork, in a dry, sunny situation. Of the annuals, *columnæ*, *lyrata*, *maritima*, and *obovata*, are best. Of the perennials,

coronopifolia, *lævigata*, and *sempervirens* are the most desirable, but none are worth cultivation outside botanical collections.

BISERIAL, or **BISERIATE**. Arranged in two parallel rows.

BISERRATE. Toothed in a saw-like manner, but with the primary teeth again serrated.

BISULCATE. Doubly furrowed.

BITERNATE. Twice ternate.

BITTER ALMOND. *See* **Amygdalus communis amara.**

BITTER APPLE. *See* **Cucumis Colocynthis**.

BITTER-SWEET. *See* **Solanum Dulcamara**.

BITTER VETCH. *See* **Orobus**.

BITUMINOUS. Clammy, adhesive.

BIVONÆA (named after Antonio Bivona-Bernardi, a Sicilian botanist, author of "Sicularum Plantarum Centuria I. et II.," Palermo, 1806). ORD. *Cruciferæ*. A pretty little monotypic genus, well adapted for ornamenting rockwork or the front of flower borders. A dry sandy soil is most suitable for its culture. Propagated by seeds, sown in spring where the plants are intended to remain, thinning-out being necessary to ensure full growth.

B. lutea (yellow).* *fl.* yellow, small; racemes terminal, elongated as they grow; pedicels filiform, bractless. April. *l.* alternate, lower ones stalked, the rest sessile, cordate, stem-clasping at the base, ovate, toothed, bluntish. Stem filiform,

sparingly branched. *h.* 3in. to 6in. Sicily, 1823. An annual.

BIXA (its South American name). Arnatto. ORD. *Bixineæ*. Stove evergreen trees, with dichotomous panicles of large reddish flowers, broad cordate leaves, and prickly capsules. A compost of loam and peat is well adapted to their culture. Propagated by seed, sown when ripe in bottom heat; or by cuttings, which root freely in sand, under a hand glass, in heat; the latter is the better method. If grown from seed, the trees attain a large size before they flower; whereas cuttings, taken from a flowering plant and struck, may be brought to flower when small plants.

B. Orellana (Orellana). *fl.* pale peach-coloured; corymbs terminal, panicled; peduncles two, three, and four-flowered. May to August. *l.* cordate, ovate, acuminated, entire or angular, smooth on both surfaces. The drug called Arnatto is prepared from the red pulp which covers the seed of this species. It is used in the preparation of chocolate, and by farmers for colouring cheese, and also as an orange or yellow dye for silks. *h.* 30ft. West Indian Islands, 1690. See Fig. 253. (B. M. 1456.)

BIXINEÆ. An order of smoothish tropical trees or shrubs, not remarkable for any particular beauty. Flowers with or without petals, when present five and sepal-like; stamens indefinite in number, inserted in the receptacle or at the bottom of the calyx; peduncle axillary or terminal, bracteate, one

or many-flowered, usually forming terminal panicles. Fruit fleshy or dry. Leaves alternate, simple, entire, or slightly lobed, generally full of pellucid dots. The genera best known are *Azara*, *Bixa*, and *Flacourtia*.



Fig. 253. Flowering Branch of Bixa Orellana.

BLACK BEARBERRY. *See* **Arctostaphylos alpina**.

BLACK BEETLES. *See* **Cockroaches**.

BLACK BRYONY. *See* **Tamus communis**.

BLACK BULLACE. *See* **Prunus insititia**.

BLACKBURNIA. *See* **Xanthoxylum**.

BLACK FLY or BEAN FLY (*Aphis rumicis*), also called Collier and Black Dolphin. This Fly (see Fig. 254) is found on many herbaceous plants. It is very injurious to Beans; hence, immediate means of destruction must be employed directly the insect appears. Its extermination is an extremely difficult matter; but the following remedies are very effectual:

Tobacco Water. This, made and applied as recommended for Aphides (which *see*) is a good remedy; but it is rendered more certain by the

employment of soapsuds, instead of clear water, in its manufacture.

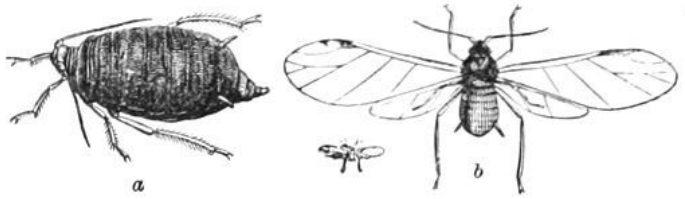


Fig. 254. The Bean Fly. *a*, Female, magnified; *b*, Male, natural size, and magnified.

Paris Green (Arseniate of Copper). Owing to its poisonous nature, this should not be used where there is fruit on the trees or vegetables under them; but there is no better destroyer of hard-dying insects. Its application is very simple. Mix 1lb. of the green with 30gals. of water, and well wet the infested parts of the trees, using a fine-rosed watercan or garden engine for the purpose. The operator's hands should be free from sores and scratches, or dangerous ulcerations may ensue.

Gas Liquor. If this can be obtained from a gas-house, it should be diluted with twice its bulk of water, and applied in the same manner as Paris Green, being washed off with clean water in a few hours. If the process be repeated on two or three consecutive nights, it will be found certain in its effects; moreover, it is not very poisonous. The finger or thumb, or the Aphis brush, applied early, will often exterminate these obnoxious insects at once. The first of the methods above described is perhaps the most accessible and the safest to use. Poisonous insecticides are more or less dangerous, especially in the hands of the inexperienced. Black Fly is, however, one of the most difficult insects to eradicate, especially if allowed to multiply. A

syringing of clean water should follow either of the above applications. *See also* **Aphides.**

BLACK JACK OAK. *See* **Quercus nigra**.

BLACK MAIDENHAIR SPLEENWORT. *See* **Asplenium Adiantum-nigrum.**

BLACK PINE. *See* **Pinus austriaca**.

BLACKTHORN. *See* **Prunus spinosa**.

BLACK VARNISH TREE. *See* **Melanorrhœa**.

BLACK WATTLE. *See* **Callicoma serratifolia.**

BLADDER CATCHFLY. *See* **Silene inflata**.

BLADDER KETMIA. *See* **Hibiscus Trionum**.

BLADDER NUT. *See* **Staphylea**.

BLADDER SENNA. *See* **Colutea**.

BLADDER WORT. *See* **Utricularia**.

BLADE. The lamina or expanded part of a leaf.

BLÆRIA (named after Patrick Blair, M.D., F.R.S., who practised medicine at Boston, in Lincolnshire, and was author of "Miscellaneous Observations," 1718; "Botanic Essays," 1820, &c.). ORD. *Ericaceæ*. Pretty little greenhouse evergreen shrubs, natives of Southern and Tropical Africa. Flowers terminal, glomerate; corolla short-tubular, with a four-cleft limb, very freely branched. Leaves verticillate, with revolute margins. For culture, *see* **Erica**.

B. articulata (jointed).* *fl.* reddish; heads drooping. May. *l.* four in a whorl, ovate or linear, glabrous, and shining; bracts solitary. *h.* 1ft. 1795.

B. ericoides (Heath-like). *fl.*

purplish-red. August. *l.* four in a whorl, oblong, obtuse, ringed; bracts three, length of the calyx. *h.* 2ft. 1774. SYN. *Erica orbicularis*. (L. B. C. 153.)

B. purpurea (purple). *fl.* purple; heads drooping. June. *l.* four in a whorl, ovate, sub-ciliated. Stem flexuous, erect. *h.* 2ft. 1791.

BLAKEA (named after Martin Blake, of Antigua, a great promoter of useful knowledge). ORD. *Melastomaceæ*. Handsome stove evergreen shrubs or trees. Flowers red, large, showy; peduncles axillary, terete, one-flowered, naked, opposite or solitary, shorter than the leaves, usually with brown tomentum. Leaves petiolate, three to five-nerved, coriaceous, glabrous above and shining, but usually densely clothed with rusty tomentum beneath. They thrive well in peat, or a mixture of loam and peat, and require to be liberally supplied with water, particularly in spring and summer. Cuttings root freely if taken from shoots that are quite ripe (otherwise they are apt to rot), planted in a pot of sand, and plunged in a moist heat, under a hand glass.

B. quinquenervia (five-nerved). *fl.* flesh-coloured, large, with white disks; peduncles twin, shorter than the petioles. June. *l.* elliptic, acuminated, naked, and shining on both surfaces, five-nerved. *h.* 10ft. to 16ft. Guiana, 1820. (A. G. 210.)

B. trinervia (three-nerved). *fl.* rose colour, large; peduncles solitary,

longer than the petioles. June. *l.* oval-oblong, three-nerved, glabrous and shining on both surfaces in the adult state, and when young serrulated; petioles and branchlets clothed with rusty tomentum. Roots issuing from the branches and stems. *h.* 4ft. to 8ft. Jamaica, 1789. (B. M. 451.)

BLANCHING. This process is effected for the purpose of obtaining crispness, and for converting what would, under ordinary circumstances, be a dangerous plant—in the case of Celery especially so—into a highly popular delicacy. Blanching can only be accomplished by entirely excluding the light from the plants, thus depriving the colouring matters of their power to decompose water and carbonic acid gas. It is also termed Etiolation.

BLANDFORDIA (named after George, Marquis of Blandford). ORD. *Liliaceæ*. A very beautiful genus of greenhouse bulbous plants, natives of Australia. Flowers solitary, on recurved pedicels; perianth funnel-shaped, six-cleft; stamens six. Leaves linear, elongate, striate; radical ones dilated, and somewhat sheathing at the base; others shorter and more distant, appearing on the flower-stem. The best soil in which to grow them is loam and peat in equal proportions, with a little rough silver sand added. They should be repotted moderately firm in the autumn, allowing good drainage, and should then be placed under the greenhouse stage, or in any other position where they will be free from water drippings. Water must only be given when dry, until they commence to grow, when it may be gradually increased, and they may be introduced into a higher

temperature, if necessary, there to remain till after flowering. When the foliage is ripened off, they may be stored away until the time for repotting. Propagated by seeds and offsets, or by division of the old plants, which must be done when repotting.

B. aurea (golden).* *fl.* 1½in. to 2in. long; scape bearing an umbellate cluster of three to five pure golden-yellow drooping bell-shaped flowers. Summer. *l.* narrow, linear, keeled or channelled, from the base of which the flower-scape arises. *h.* 1ft. to 2ft. New South Wales, 1870. (B. M. 5809.)

B. Cunninghamii (Cunningham's).* *fl.* rich coppery red, the upper part yellow; about 2in. long, bell-shaped, pendulous; from twelve to twenty, terminating in a stout scape 3ft. high. June. *l.* linear, slightly keeled at the back, about ⅓in. broad. New South Wales. This magnificent species should have a little charcoal mixed with the soil already mentioned. (B. M. 5734.)

B. C. hybrida (hybrid). *fl.* red, margined with clear yellow, bell-shaped, in a dense drooping umbel.

B. flammea (fiery).* *fl.* dullish yellow, in dense umbel-like clusters; bracts ovate-lanceolate, stiff; perianth inversely conical. June. *l.* linear, bluntly keeled. *h.* 2ft. Australia, 1849.

B. f. elegans (elegant).* *fl.* crimson, tipped with yellow, large, funnel-shaped. Summer. *l.* long, linear-ensiform. This very handsome form is often taken for the type.

B. f. princeps (magnificent).* *fl.* rich orange-red externally, and bright yellow within, about 3in. long, tubular, borne on a scape about 1ft. high, slightly pendulous, and arranged near the summit. Summer. *l.* stiff, sub-erect, long, bright green, disposed in a distichous manner. This is a very splendid greenhouse plant, and should be in every collection. Australia, 1873. SYN. *B. princeps*. See Fig. 255. (B. M. 6209.)

B. grandiflora (large-flowered).* *fl.* crimson, very large; bracts as long as the pedicels, the inner much the shortest. July. *h.* 2ft. New South Wales, 1812. (B. R. 924.)

B. intermedia (intermediate). *fl.* yellow, pendulous, funnel-shaped, in sixteen to twenty-flowered racemes; bracts leaf-formed. September. *l.* channelled, acutely keeled, scabrous on the margins. *h.* 1½ft. Australia.

B. marginata (margined). *fl.* orange-red, conical, in long pendulous racemes; bracts narrow, foliaceous, about equalling in length the pedicels. July. *l.* stiff, sub-erect, with scabrous margins. *h.* 2ft. Tasmania,

1842. (B. R. 31, 18.)

B. nobilis (noble).* *fl.* orange with yellow margins, on long pedicels, drooping, disposed in a terminal raceme; bracts twice as short as the pedicels. July. *l.* very narrow. *h.* 2ft. New South Wales, 1803. (B. M. 2003.)

B. princeps (magnificent). Synonymous with *B. flammea princeps*.

BLATTA. *See* **Cockroaches**.

BLEABERRY. *See* **Vaccinium Myrtillus**.

BLEACHING POWDER. *See* **Chloride of Lime**.

BLECHNUM (from *Blechnon*, the Greek name of a fern). ORD. *Filices*. A very attractive genus of stove and greenhouse ferns, thriving in a compost of peat, leaf soil, and loam. Sori linear, continuous, or nearly so, parallel with, and usually contiguous to, the midrib. Involucre distinct from the edge of the frond. Fronds uniform, generally pinnate or pinnatifid. Veins usually free. For general culture, *see* **Ferns**.

B. australe (southern).* *cau.* stout, creeping, scaly; *sti.* erect, 4in. to 6in. long. *fronds* 9in. to 18in. long, and from 2in. to 3in. broad, lanceolate, narrowed towards both ends; pinnæ numerous, the barren ones 1in. to 1½in. long, ¼in. to ⅜in. broad, linear, hastate-cordate, or auricled at the base, especially on the upper side, with a very coriaceous texture;

fertile pinnæ narrower. *sori* in a continuous or slightly broken line, close, but not contiguous, to the midrib. South Africa, &c., 1691. Greenhouse species.

B. boreale. *See* **Lomaria Spicant**.

B. braziliense (Brazilian).* *cau.* erect, stout, sub-arborescent, 1ft. or more long, densely clothed at the crown with dark brown scales. *sti.* short, stout, densely scaly. *fronds* oblong-lanceolate, 2ft. to 4ft. long, 6in. to 16in. broad, narrowing downwards very gradually; pinnæ close, linear, 4in. to 8in. long, ½in. to ¾in. broad, narrowed gradually towards the point, finely toothed or undulated, connected at the base. Brazil and Peru, 1820. See Fig. 256. (H. S. F. 3, 157.) There is a very pretty variety met with in gardens under the name of *Corcovadense crispum*, which is not quite so strong-growing as the type, with wavy, crispy edges. They will all thrive in the cool of a stove fernery.



Fig. 255. Blandfordia flammea princeps.

B. cartilagineum (cartilaginous). *cau.* oblique, densely scaly at top. *sti.* strong, erect, 4in. to 6in. long, scaly, muricated in the lower part. *fronds* ovate-oblong, 2ft. to 3ft. long, 6in. to 12in. broad; pinnæ numerous, linear, 4in. to 6in. long, about ½in. broad, narrowed gradually towards

the point, margin finely toothed, dilated, and connected at the base. *sori* in a broad line close to the midrib. Temperate Australia, 1820. Greenhouse species.

B. hastatum (halbert-shaped).* *rhiz.* short, stout, scaly. *sti.* 4in. to 6in. long, nearly naked. *fronds* from 9in. to 18in. long, and 2in. to 4in. broad, lanceolate, with twenty to forty pinnæ on each side; the barren ones 1in. to 1½in. long, lanceolate, falcate, narrowed gradually to a point, the lower side slightly truncate, and slightly lobed, the upper cordate, with a large hastate auricle; fertile pinnæ narrower. *sori* midway between the midrib and margin; rachis and surfaces naked or slightly pubescent; texture coriaceous. Temperate South America, 1841. Greenhouse species.

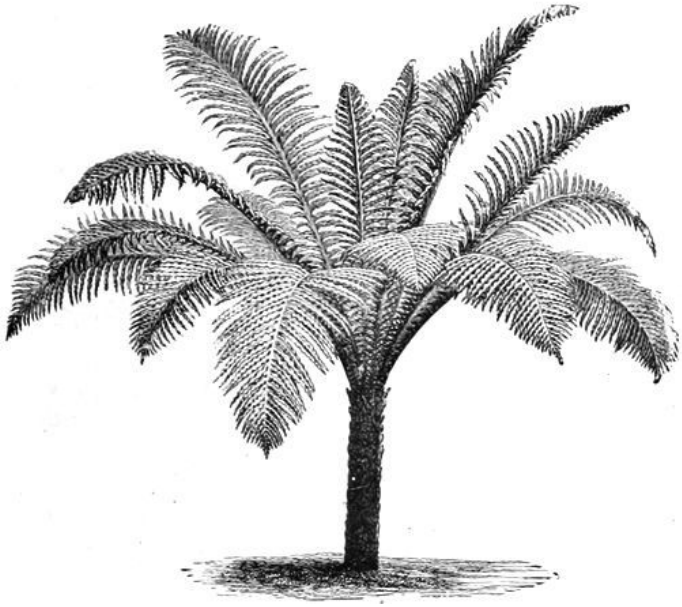


FIG. 256. BLECHNUM BRAZILIENSE.

B. Lanceola (lance-leaved). *rhiz.* slender, creeping, stoloniferous. *sti.* slender, erect, 2in. to 4in. long. *fronds* lanceolate, undivided, 4in. to 6in. long, ½in. broad, or less, narrowed gradually from the centre towards each end. Tropical America, 1820. Stove species.

B. L. trifoliatum (three-leaved). *fronds* furnished with one or two pairs of small oblong-obtuse lateral pinnæ at the base of the large terminal one. Stove variety. (H. S. F. 3, 94.)

B. longifolium (long-leaved).* *rhiz.* slender, creeping. *sti.* firm, erect,

nearly naked, 6in. to 12in. long. *fronds* 6in. to 9in. long, with a terminal pinna, and three to six lateral ones on each side, which are 3in. to 5in. long, and ½in. broad, narrowed gradually towards the point. *sori* in broad lines close to the midrib; texture coriaceous. Tropical America, 1820. *B. l. fraxineum* is a variety found in gardens under the name of *B. fraxiniifolium*, with a habit more close than the type; pinnæ six to eight on a side, sometimes 1in. broad. *B. intermedium* (Link.) and *B. gracile* (Kaulf.), often seen in gardens, are slender-growing varieties of this rather variable stove species.

B. nitidum (shining).* *sti.* stout, erect, naked, 3in. to 4in. long. *fronds* oblong-lanceolate, 1ft. or more long, 4in. to 6in. broad; pinnæ numerous, sub-falcate, linear, 3in. to 4in. long, ¼in. to ½in. broad, narrowed gradually towards the point, dilated and connected at the base; edge undulate-dentate; texture coriaceous; both surfaces smooth. Stove species. The variety *contractum*, often seen in gardens, has its pinnæ contracted, and the edge much undulated. Brazil. (H. S. F. 3, 55.)

B. occidentale (western).* *cau.* stout, erect, scaly at the top. *sti.* 6in. to 12in. long, erect, scaly below.

fronds ovate-acuminate, 9in. to 18in. long, 4in. to 8in. broad, with twelve to twenty-four linear pinnæ on each side, which are 2in. to 4in. long, and about ¾in. broad, narrowed gradually to a point, truncate or cordate; texture coriaceous. West Indies, southwards to Chili and South Brazil, 1823. A very handsome stove or greenhouse fern.

B. o. multifidum (much-cut).* A pretty variety, said to have been introduced from Dominica; the apices of the pinnæ are copiously crested and tasselled, rendering it very desirable. Stove variety.

B. orientale (oriental).* *cau.* stout, erect, clothed at the crown with dark brown scales. *sti.* 4in. to 8in. long, strong, erect, scaly below. *fronds* 1ft. to 3ft. long, 6in. to 12in. broad, ovate, with very numerous nearly contiguous pinnæ on each side, which are 4in. to 8in. long, and about ¾in. broad, narrowed to a long point. Australia, northwards to South China and the Himalayas. Greenhouse.

B. polypodioides (Polypodium-like). A synonym of *B. unilaterale*.

B. serrulatum (saw-edged).* *cau.* elongated, stout, ascending. *sti.* 6in. to 12in. long, strong, erect, smooth, nearly naked. *fronds* oblong-acuminate, 1ft. to 2ft. long, 6in. to

9in. broad, with twelve to twenty-four pairs of quite distinct articulated linear oblong pinnæ on each side, which are about 4in. to 5in. long, ½in. broad, narrowed gradually towards the point, and downwards to a narrow base, the margins finely incised. Florida, &c., 1819. Stove or greenhouse. SYN. *B. striatum*. (H. S. F. 3, 159.)

B. striatum (striped). A synonym of *B. serrulatum*.

B. unilaterale (one-sided).* *cau.* elongated, densely scaly at the crown. *sti.* slender, erect, 1in. to 4in. long, slightly scaly below. *fronds* lanceolate, 6in. to 12in. long, 1½in. to 2in. broad; pinnæ numerous, spreading horizontally, linear, ¾in. to 1in. long, central ones ¼in. to ⅜in. broad, point usually mucronate; edge entire, or nearly so, the lower part dilated to a broad base. *sori* in a line close to the midrib. Tropical America, 1829. Widely distributed. Stove or greenhouse species. SYN. *B. polypodioides*, under which name it is usually found in gardens.

BLECHUM (a Greek name for an unknown plant, supposed to resemble Marjoram). ORD. *Acanthaceæ*. Stove herbaceous perennials. For culture, &c., *see* **Justicia**.

B. Brownei (Browne's). *fl.* white, in

a dense bracteated spike, which is four-cornered; bracts ovate, downy. Summer. *l.* ovate elliptical, somewhat toothed. *h.* 2ft. West Indies, 1780. The other species introduced are: *angustifolium*, blue; *braziliense*, blue; and *laxiflorum*, white.

BLEPHARIS (from *blepharis*, the eyelash; in reference to the fringed bracts of the calyx). ORD. *Acanthaceæ*. Dwarf shrubs or herbs, often spiny and woody, allied to *Acanthus*. Flowers in bracteate spikes; calyx cruciately four-parted, bracteate; upper segment entire, three-nerved; lower, two-nerved; corolla-tube very short; lip five-lobed, three lobes often much larger than the others; stamens four, sub-didynamous. For culture, &c., *see* **Acanthus**.

B. boerhaaviæfolia (Boerhaavia-leaved). *fl.* blue. July. *l.* usually four in a whorl, elliptic, toothed. *h.* 1ft. India, 1829. Stove annual.

B. capensis (Cape Colony).* *fl.* blue. July. *l.* narrow, lanceolate, spinose. *h.* 1ft. Cape of Good Hope, 1816. Greenhouse biennial.

B. furcata (forked-spined). *fl.* blue. July. *l.* lanceolate, entire or spiny; bracts large, strongly spinose. *h.* 2ft. Cape of Good Hope, 1846. Greenhouse evergreen shrub.

B. linearifolia (narrow-leaved). *fl.* blue. July. *l.* long, entire, linear, glabrous or hairy, not spiny. *h.* 2ft.

Guinea, 1823. Stove annual.

B. procumbens (trailing).* *fl.* blue. July. *l.* linear lanceolate, spiny. *h.* 1ft. Cape of Good Hope, 1825. Greenhouse evergreen trailer.

BLEPHILIA (from *blepharis*, the eyelash; in allusion to the ciliated bracts). ORD. *Labiatæ*. Ornamental hardy perennials, closely allied to *Monarda*, but differing from it in the calyx tube having thirteen instead of fifteen nerves, and being naked in the throat, while the corollas are much smaller and more dilated. They are of easy culture in ordinary soil. Increased readily by dividing the roots in early spring.

B. ciliata (ciliated). *fl.* blue; whorls all distinct; bracts ciliated, reddish at top. July. *l.* almost sessile, ovate-oblong, narrowed at the base, canescent beneath. *h.* 1ft. to 2ft. North America, 1798.

B. hirsuta (hairy). *fl.* purple or blue; whorls more numerous than in the preceding; upper ones approximate. July. *l.* petiolate, ovate, roundly cordate at the base, hairy on both surfaces. *h.* 1ft. to 2ft. Virginia, 1798. Habit more branched and loose than in *B. ciliata*.

BLESSED THISTLE. *See* **Cnicus benedictus**, properly **Carbenia benedicta**.

BLETIA (in honour of Don Louis Blet, a Spanish botanist). ORD. *Orchideæ*. A large genus of, for the

most part, stove terrestrial orchids. Flowers purple or whitish, in terminal racemes. Leaves narrow, grass-like. Pseudo-bulbs round, flattened. The flowers are freely produced when the plants are thoroughly established, and are valuable for bouquets, as well for their pleasing colour as for the time they last in perfection. Bletias thrive best in a compost of loam and leaf mould. About 2in. of crocks, covered with a layer of moss, should be placed in the bottom of the pot, which should be filled to within 1in. of the top with soil. The bulbs should then be inserted, and just covered. A good supply of water during the growing season is necessary, and only a moderate amount of heat. After growth has ceased, a period of rest is required, during which time very little water should be given. Propagation is effected by divisions, which should be made after the plants have finished flowering, or previous to their starting into growth.

B. campanulata (bell-shaped). *fl.* deep purple, with a white centre, lasting a considerable time in perfection. Mexico.

B. florida (florid).* *fl.* pale rose-coloured; lip not spurred. July and August. *h.* 2ft. West Indies, 1786. A very pretty species. (B. R. 1401.)

B. gracilis (slender). *fl.* pale greenish-white; sepals and petals nearly equal, lanceolate, acuminate; lip red and yellow; scape simple. *l.* oblong, lanceolate, plicate. *h.* 1½in. Mexico, 1830. (B. R. 1681.)

B. hyacinthina (Hyacinth-like).* *fl.* purple, racemose; lip not spurred,

beardless; scape about as long as the leaves. March to June. *l.* lanceolate. *h.* 1ft. China, 1802. This pretty species has proved to be quite hardy. (Garden, Nov., 1879.)

B. patula (spreading-flowered). *fl.* purple, spreading; scape tall, branched. March. *l.* lanceolate. *h.* 2ft. Hayti, 1830. (B. M., 3518.)

B. Shepherdii (Shepherd's).* *fl.* on branching spikes, purple, marked down the centre of the lip with yellow. Winter. *l.* long, lanceolate, dark green. Jamaica, 1825. (B. M. 3319.)

B. Sherrattiana (Sherratt's).* *fl.* about a dozen on a spike, rich rosy purple; petals very broad, twice the breadth of the sepals; lip deep purple in front, marked with white and yellow down the centre. *l.* three to four-plicate. Pseudo-bulbs depressed. New Grenada, 1867. (B. M. 5646.)

B. verecunda (modest). *fl.* purple; lip not spurred. January. *h.* 3ft. West Indies, Mexico, &c., 1733. (B. M. 930.)

BLIGHIA SAPIDA. The Akee Tree. This is now included under the genus **Cupania** (which *see*).

BLIGHT, or **BLAST**. Applied to various diseases of plants which are caused or accelerated either by the presence of parasitic fungi or insects, or by

atmospheric influence. Blight generally proves fatal to the whole or part of the subject attacked.

BLIND. A term applied to plants which fail to produce central buds. The defect is frequently noticeable in the Cabbage, and other plants of the *Brassica* tribe; and is, perhaps, mainly due to the attacks of insects in a very early stage. Great care should therefore be exercised in keeping the seed beds clear of insect pests, by the application of ashes, lime, and soot, or spent hops.

BLOOD FLOWER. *See* **Hæmanthus**.

BLOODROOT. *See* **Sanguinaria canadensis**.

BLOOM. A fine powder-like substance found on Grapes, Cucumbers, Plums, &c., and varying in colour in the different subjects. It should be carefully protected, as it improves the appearance of the fruit. The term is also generally used—although incorrectly—as the plural of blossom.

BLOSSOM. The flower of a plant, or the essential organs of reproduction, with their appendages.

BLUE-BELLS. *See* **Campanula rotundifolia** and **Scilla nutans**.

BLUE-BOTTLE. *See* **Centaurea Cyanus**.

BLUE GUM TREE. *See* **Eucalyptus globulus**.

BLUETS. The French name for *Centaurea Cyanus*. *See also* **Houstonia cœrulea** and **Vaccinium angustifolium**.

BLUMENBACHIA (in honour of John Frederick Blumenbach, M.D., Professor of Medicine at Göttingen, and distinguished as a comparative anatomist). ORD. *Loasaceæ*. Elegant branched, climbing or trailing, annual, biennial, or perennial

herbs, generally covered with stinging hairs, which are very objectionable. Flowers axillary, solitary, bracteate, very pretty and interesting. Leaves opposite, lobed. They are of easy culture in ordinary garden soil. Propagated by seeds, which should be sown in pots, in spring, and placed in a gentle heat, where they will germinate in about a fortnight. When the seedlings are large enough, and after having been previously hardened off, they may be planted out in their blooming quarters, or potted on and trained to a trellis.

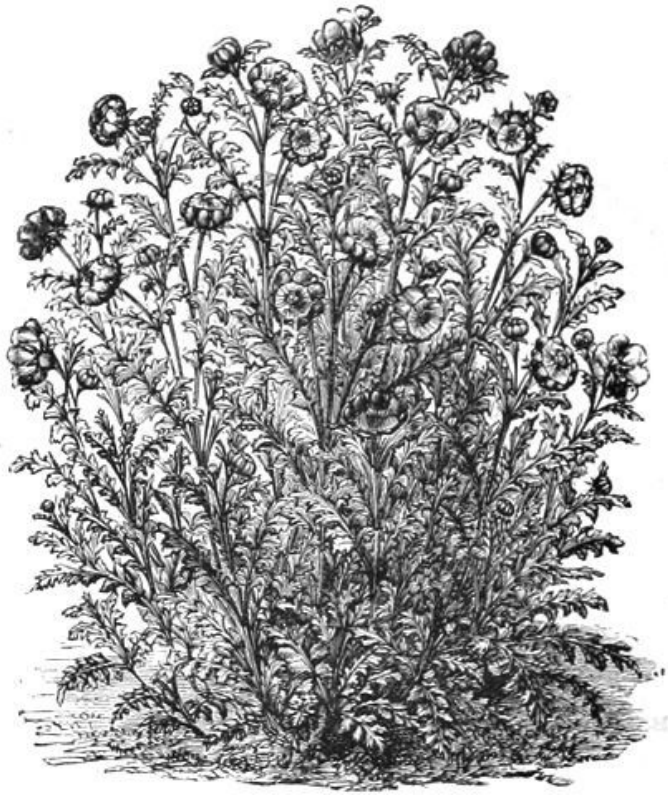


Fig. 257. Blumenbachia chuquitensis.

B. chuquitensis (Chuquitan).* *fl.* solitary, axillary, with five to ten boat-shaped red petals, which are yellow within. September. *l.* oblong-lanceolate, pinnate; segments pinnatifidly lobed. Peru, 1863. Half-hardy climbing perennial. See Fig. 257. (B. M. 6143.)

B. contorta (twisted).* *fl.* orange-red, with cup-shaped green scales within. July. *l.* oblong-ovate, pinnatifid; lobes incisely toothed. Peru. Greenhouse climber, but may be grown against a wall, out of doors, during the summer. (B. M. 6134.)

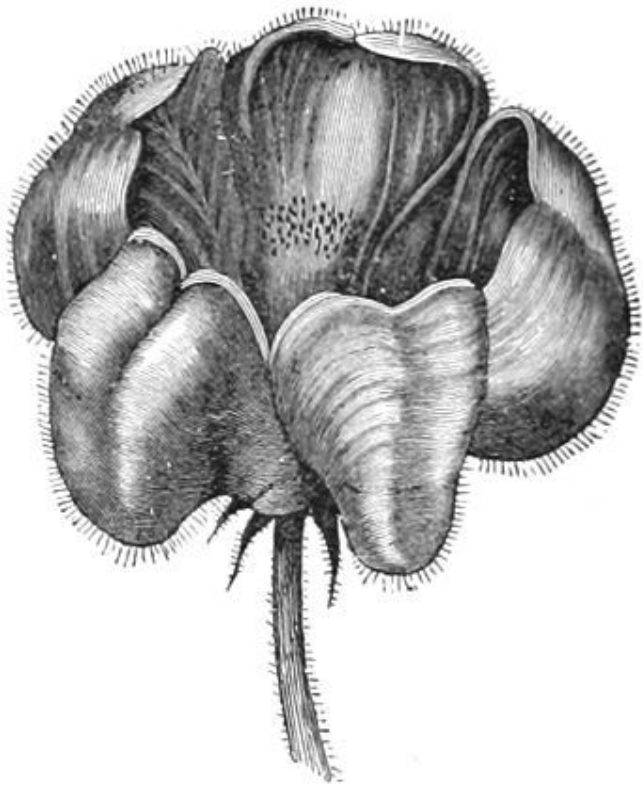


Fig. 258. Flower of Blumenbachia coronata.

B. coronata (crowned).* *fl.* of pure glossy whiteness, quadrangular, crown-shaped, 2in. in diameter each way. June. *l.* narrow, bipinnatifid, cut into small segments. *h.* 1½ft. Chili, 1872. This is an elegant dwarf, tufted, erect biennial, with the pure white blooms imbedded in the metallic lustrous foliage. Syn. *Caiophora coronata*. See Fig. 258.

B. insignis (remarkable).* *fl.* with whitish petals and reddish-yellow

scales, axillary, on long peduncles, about 1in. in diameter. July. *l.*, lower ones five to seven-lobed; upper ones deeply bipinnatifid. *h.* 1ft. Chili, 1826. Hardy annual trailer. SYN. *Loasa palmata*. (B. M. 2865.)

BOBARTIA (named after Jacob Bobart, Professor of Botany at Oxford in the seventeenth century). ORD. *Irideæ*. A small genus of greenhouse or hardy bulbous plants, closely allied to *Sisyrinchium*. The species in cultivation are very pretty hardy plants, but require protection from severe frosts and excessive rains. They thrive best in a warm, light soil, and make pretty plants for rockwork. Propagated by separating the offsets during autumn. This genus has been much misunderstood. Among the plants which have been referred to it are some which now find places in the genera *Aristea*, *Sisyrinchium*, *Homeria*, *Marica*, *Morœa*, &c., &c.

B. aurantiaca. *See* **Homeria aurantiaca**.

B. gladiata (sword-shaped). *fl.* yellow, thinly sprinkled with purple dots near the centre, handsome, nearly 2in. across. *l.* linear, ensiform, narrow, slightly glaucous, 1ft. or more in length. 1817. SYN. *Marica gladiata*. (B. R. 229.)

B. spathacea (rush-like). *l.* rush-like, several feet in length; flower-stem as long as leaves, bearing near extremity a cluster of pale yellow flowers, with narrow segments. Each

flower lasts but one day; as a good many, however, are developed in each spathe, there is a succession which lasts some time. 1832. SYN. *Xyris altissima*. (L. B. C. 1900.)



FIG. 259. BOCCONIA CORDATA, showing Habit and Flower.

BOCCONIA (named after Paolo Bocconi, M.D., a Sicilian botanist, author of the "Museum des Plantes," and "Histoire Naturelle de l'Ile de Corse," &c.). ORD. *Papaveraceæ*. Two of the species are greenhouse or

half-hardy shrubs. Flowers inconspicuous, in terminal panicles, with the branches and branchlets each furnished with one bract. Leaves stalked, glaucous, large, lobed. This genus does not well agree with the rest of *Papaveraceæ*, from its having one-seeded capsules and apetalous flowers. *B. cordata* is a handsome, hardy, herbaceous plant, with a stately habit and finely-cut foliage, and, where bold subjects are desired, few will be found superior to it. As an isolated specimen on the lawn, or by frequented walks, where it will not be too closely surrounded by tall plants, it may be grown with marked effect. It also forms a good subject for pot culture, and is largely used for sub-tropical bedding. The soil most suitable for its culture is a good fat loam, of considerable depth. Propagated by cuttings, taken from the axils of the larger leaves, during early summer; or by young suckers, taken from established plants, during summer, as they will then flower the following season. If the former method is employed, the cuttings should be pushed on, so that there are plenty of roots before the winter sets in. The other two species require greenhouse culture; but both are eminently suited for sub-tropical gardening, in any light rich soil, or well-drained and airy situation. They are best propagated by seeds, sown in a hotbed in spring, the seedlings being placed out from June to September.

B. cordata (cordate).* *fl.* buff-coloured, very numerous, borne in very large terminal panicles; individually they are not showy, but the fully grown inflorescence has a very distinct and pleasing appearance. Summer. *l.* large,

reflexed, deeply-veined, roundish-cordate; margins lobed or sinuated. Stems growing rather close together, thickly set with leaves. *h.* 5ft. to 8ft. China, 1795, and 1866. Mr. Robinson recommends its being grown in the angle of two walls which shelter it from the north and east. It runs quickly at the roots, and the suckers may be cut off to the benefit of the parent plant; each sucker will form a strong plant in a year's time. SYNS. *B. japonica* and *Macleaya yedoënsis*. See Fig. 259. (B. M. 1905.)

B. frutescens (shrubby).* *fl.* greenish. October. *l.* large, sea-green, oval-oblong, cuneated at the base, pinnatifid. *h.* 3ft. to 6ft. Mexico, 1739. (L. B. C. 83.)

B. integrifolia (entire-leaved). *fl.* greenish; panicle crowded. *l.* flat, oblong, tapering towards each end, entire, or scarcely crenated. *h.* 9ft. Peru, 1822.

B. japonica (Japanese). Synonymous with *B. cordata*.

BŒBERA (named after Bœber, a Russian botanist). ORD. *Compositæ*. A genus of evergreen greenhouse shrubs, now generally referred to *Dysodia*. They are of easy culture, thriving in ordinary garden soil. Propagated by cuttings, made of young, rather firm, shoots, and placed in sand, under a glass. There are several other species besides the one given below,

but they are not of much horticultural value.

B. incana (hoary).* *fl.-heads* golden; peduncles one-headed. November. *l.* pinnate, rather hairy; leaflets linear acute, channelled, some entire, and some trifid. Stem hairy. *h.* 1½ft. Mexico, 1828. (B. R. 1602.)

BŒHMERIA (named after George Rudolph Bœhmer, a German botanist). ORD. *Urticaceæ*. A genus of shrubs or herbaceous plants, allied to *Urtica*, from which it is distinguished in not having stinging hairs. *B. nivea* is the only species having any horticultural value. This thrives best in a warm, sandy soil; and is increased by divisions.

B. nivea (snowy). *fl.* greenish, disposed in spikes. *l.* broadly cordate, about 6in. long by 4in. broad, terminating in a long slender point; edges serrate, covered on the under side with a dense coating of white down. *h.* 3ft. to 4ft. China. A shrub-like perennial, rather more curious than beautiful.

BOG BEAN. *See* **Menyanthes trifoliata**.

BOG-EARTH. *See* **Peat**.

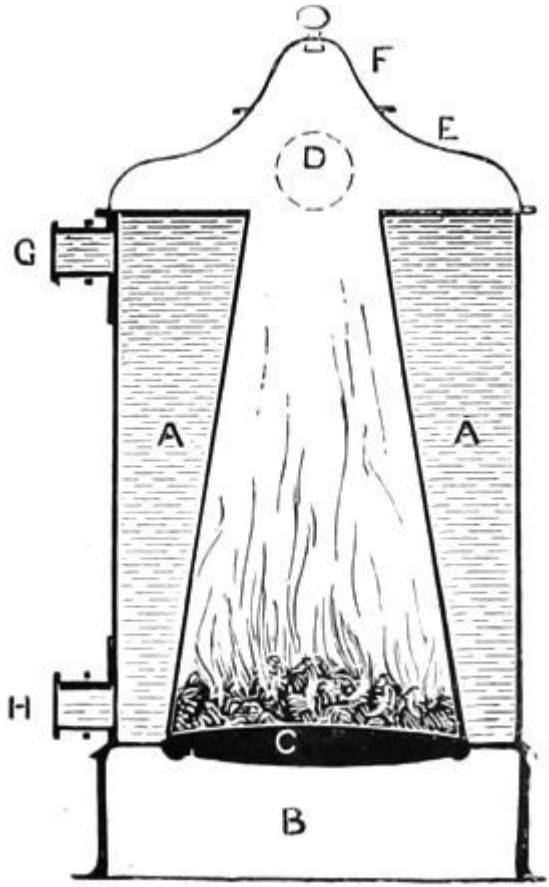


FIG. 260. VERTICAL SECTION OF CYLINDER BOILER.

A A, Wrought-iron Boiler, the shaded space showing the Waterway; B, Ashpit inside the cast base of Boiler; C, Fire-bars; D, Flue; E, Domed Top; F, Feeding Lid; G, Flow, and H, Return Pipe Sockets.

BOILERS. These are very important articles in all gardens where there are glass houses, and the best should always be selected. They are made in cast and wrought iron, both of which have their special advantages and disadvantages. The former are less liable to burn through when encrusted with any

deposit from the water, but will crack with sudden changes of temperature, by reason of the granular form of the metal not allowing gradual contraction; the latter may burn through where there is any deposit of mud or other matter, but they will not crack, and will stand a greater pressure than those made of cast metal. It is, however, the better plan to use Boilers of wrought iron, as, with careful usage, they are less liable to break down in hard frosts than are the others. As the value of the plants, as well as that of the Boiler, has to be considered, should such a contingency occur, it is certainly advisable to reduce all risks to a minimum; and as the average life of a Boiler is from ten to fifteen years, a slightly larger first cost is not of very serious moment. The forms of Boilers are very diverse, and, in some of the patented forms, complicated. But, whatever the shape, the following points are essential: A clear and unrestricted waterway of not less than 2in. in thickness; the greatest exposure of surface to the direct action of the fire; a sufficient fire space; and a fire-bar area calculated to supply enough fresh air to the fire to support thorough combustion. The forms generally used for horticultural work are the following, or some modifications of them; and, however grand the name, their chief value consists in the attested heating capacity at a given cost: The Saddle Boiler, which is made of various sizes, with or without check ends, cross tubes, and other devices for increasing the heating surface, and also of a tubular form; the Upright Cylinder (a vertical section of which is shown in Fig. 260); the Upright Tubular Cylinder; the Horizontal Tubular; and the Cornish or Horizontal Cylinder. Combinations of the various forms, and complicated patterns of different kinds, are made for particular purposes; but in no case

should large Boilers be used, unless they are recommended, by one competent to judge, as suitable for the purpose they are needed to fulfil. In every case, it is necessary that the Boiler should be fixed in a proper manner. It is also good policy to have Boilers about 30, or even 50 per cent., more powerful than is actually required, when they are new, as, from various causes, their heating power falls off in a year or two in many places; and, under ordinary work, it is not desirable to stimulate the action in order to command sufficient heat. There is no doubt that, for general purposes, some modification of the Saddle or Cylinder Boiler is by far the best, all things duly considered; but it is impossible to give any practical advice without a thorough knowledge of the requirements of any particular place. Gas Boilers are also useful for small places. These are made in many forms, and are, as a rule, in the shape of a cylinder, with a coned inside, against which the flames play. Some Gas Boilers have also a superheater attached; this exhausts the heat from the air which has passed through the Boiler. Another good form is made of horizontal tubes, which contain the water, the flames playing over and amongst them. An atmospheric burner of approved construction should be used where gas is the heating power. A sufficient supply of gas should be assured by using supply pipes of a good size. Care should be taken to keep these pipes free from water, and protected from frost by silicate cotton lagging, or some other good non-conductor. Except for very small places, however, gas apparatus is almost useless, and will never supersede fuel Boilers. For other particulars regarding Boilers, *see* **Heating** and **Stoking**.

BOIS-PERDRIX. *See* **Heisteria**.

BOLBOPHYLLUM. *See* **Bulbophyllum.**

BOLETUS (from *bolos*, a mass; in reference to its massy or globular form). Ord. *Fungi*. The only species of this rather large genus demanding mention is *B. edulis* (see Fig. 261), which is considered an excellent article of food. It is easily distinguished, and is often of large size and somewhat unshapely; the pileus is usually of a dusky yellow or brownish hue, but sometimes brighter and more of a chestnut colour; the flesh is white, and does not change to a blue colour when cut (this is a very important characteristic, and should always be noticed). It is a species common in most districts, usually growing in woods, and appearing chiefly in the autumn.



Fig. 261. Common Boletus (Boletus edulis).

BOLEUM (from *bolos*, a ball; in reference to the

shape of the seed-pods). ORD. *Cruciferæ*. An ornamental, hardy, evergreen shrub, well adapted for rockwork, in ordinary soil. It requires slight protection in winter if planted in very exposed situations. Propagated by seed, sown in a pot, in spring, and placed in a frame, or in the open border during summer.

B. asperum (rough).* *fl.* cream-coloured; racemes erect, elongated; pedicels very short, the lower ones bracteate. April. *l.* alternate, oblong, linear; lower ones somewhat divided. A suffruticose, erect, branched plant, hispid from stiff hairs. *h.* 6in. to 1ft. France. 1818.

BOLLEA. *See* **Zygopetalum**.

BOLTED. A term used in reference to plants that have prematurely run to seed.

BOLTONIA (named after J. B. Bolton, an English professor of botany). ORD. *Compositæ*. A genus of rather pretty hardy herbaceous perennials. Flower-heads with white or purplish rays. Leaves pale green, lanceolate, sessile. They thrive in common garden soil. Propagated by divisions of the roots, in March.

B. asteroides (Aster-like).* *fl.-heads* flesh-coloured, stellate, disposed in a rather large terminal panicle. August. *l.* all entire, somewhat broadly lanceolate, narrowed at both ends. *h.* 2ft. North America, 1758. (B. M. 2554.)

B. glastifolia (woad-leaved).* *fl.-*

heads pink. September. *l.*, lower ones serrated. *h.* 1½ft. North America, 1758. (B. M. 2381.)



Fig. 262. Flowers of Bomarea Carderi.

BOMAREA (derivation of name doubtful). Ord. *Amaryllidaceæ*. A genus of handsome half-hardy twiners, closely allied to *Alströmeria*, from which it is chiefly distinguished by its twining habit and some difference in the capsule. They are of comparatively easy culture, thriving in a compost of peat, leaf

mould, loam, and sand, with good drainage. Manure water should be given during the season of growth. Although they make fine pot plants, their full beauty is only developed when planted out in the conservatory or greenhouse border. Propagated by seeds, or by careful divisions of the underground stem. In making a division, it is necessary to observe that the part taken has some roots by which to live till new ones are formed. It should be potted at first, and may, when established, be planted out or shifted on. Seeds may be raised in a warm house without difficulty. They germinate in a few weeks; and when the young plants are 2in. or 3in. high, they should be placed separately in small pots, shifting them on as necessary, or planting them out. In favoured southern localities, several species have proved hardy, but they are much the best when grown in a greenhouse.

B. acutifolia Ehrenbergiana (Ehrenberg's acute-leaved). *fl.* undulate, outer segments deep orange, the inner ones paler and spotted. Spring. *l.* lanceolate acute, smooth. Mexico, 1878. (B. M. 6444).

B. Caldasiana (Caldas's).* *fl.* orange yellow, spotted crimson. *l.* ovate-lanceolate, acute. Peruvian Andes, 1863.

B. Carderi (Carder's).* *fl.* 2½in. long by 1⅛in. in breadth at the widest part, regularly bell-shaped, with six segments, the three outer rose-coloured, the three inner nearly equal in length, crenulate, and spotted with purplish-brown;

inflorescence pendulous, and consisting of a large terminal umbellate cyme, surrounded at the base by a series of crowded leaves. *l.* oblong lanceolate, acuminate, about 7in. by 2¾in. Columbia, 1876. See Fig. 262, for which we are indebted to Mr. Bull.

B. chontalensis (Chontalese). *fl.* 1½in. long, sub-campanulate, obtusely trigonous; outer segments thick, fleshy, wavy, rose-red, with a few brown spots round the margin at the tip, very convex; inner segments a little shorter, pale yellow blotched with brown; umbels surrounded by a whorl of leaves, and composed of several peduncles, each bearing four to six nodding flowers. August. *l.* lanceolate or ovate oblong, acuminate. Nicaragua, 1871. (B. M. 5927).

B. conferta (dense-flowered).* A synonym of *B. patococensis*.

B. edulis (edible). *fl.*, outer segments rose, green tipped; inner spotted with rose. St. Domingo, &c. One of the oldest species in cultivation. The tubers are said by Tussac to be eaten in St. Domingo, like those of the Jerusalem Artichoke. See Fig. 263.

B. frondea (leafy). *fl.* 2in. long, tubulate-campanulate; outer segments narrow, oblong, yellow;

inner segments ½in. longer than the outer ones, canary yellow, spotted with red; cymes umbellate, many-flowered, about 8in. across, base leafy. *l.* lanceolate, acuminate. Bogota, 1881. (G. C. n. s. 17, p. 669.)

B. oligantha (few-flowered).* *fl.* regularly funnel-shaped, about 1in. long; outer segments slightly shorter than the inner, oblanceolate, under ¼in. abroad, obtuse, unspotted, reddish on the outside, yellow within; one or two to an umbel, on simple, flexuous, glabrous pedicels, about 1in. long. *l.* long, acute, about 2in. long, bright green on the upper surface, ciliated on the ribs beneath. Peru, 1877. See Fig. 264.



FIG. 263. FLOWERING BRANCH OF BOMAREA EDULIS.

B. patococensis (Patococha). *fl.* 2in. to 2½in. long, elongate-funnel-shaped; the three outer segments ovate lanceolate, about one-fourth shorter than the inner segments, both of a rich crimson colour; numerously borne in drooping, contracted tufts at the ends of the shoots; peduncles about 2in. to 2½in. long, intermixed at the base with broadly ovate-acute, leafy bracts. August and September. *l.* scattered, shortly stalked, broadly lanceolate, tail pointed. Bogota, 1881. (G. C. n. s. 17, p. 187.)

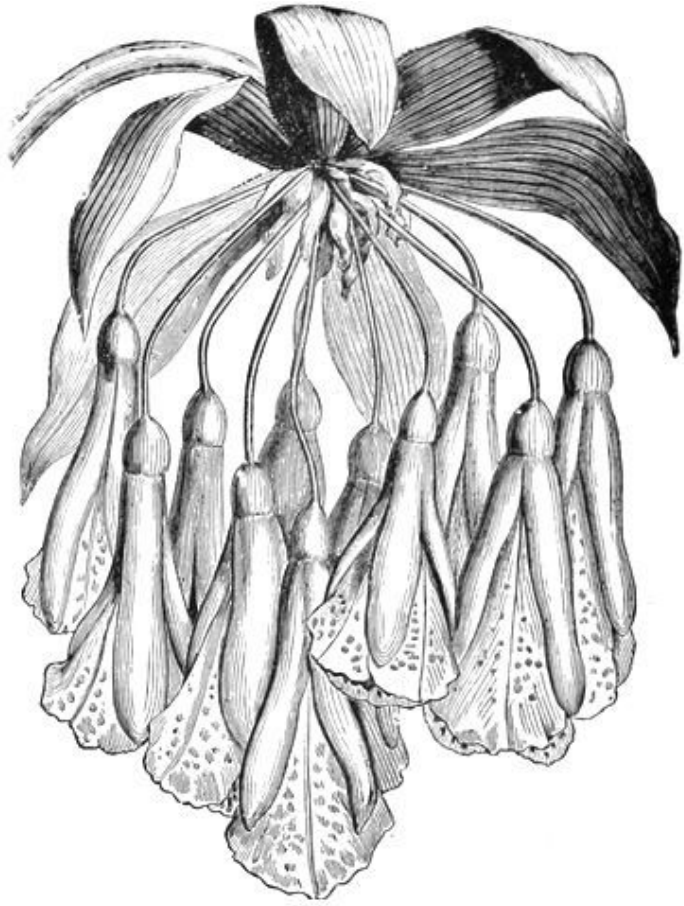


Fig. 264. Flowering Branch of Bomarea oligantha.

B. salsilla (Salsilla). *fl.* purple, about ½in. long, the two inner segments having a darker spot at the base, and all of them tinged with green towards the points; collected into a terminal umbel. June. *l.* few, lanceolate. South America, 1806. This has proved quite hardy under various conditions.

B. Shuttleworthii (Shuttleworth's).* *fl.*, perianth about 2in. long, funnel-shaped or elongate bell-shaped; segments nearly equal, oblong acute, outer ones orange vermilion, slightly tinged with green and dotted with small dark spots at the tips; inner ones more acutely pointed, canary yellow, with a red midrib, and green with dark spots at the tips; cymes umbellate, pendulous. *l.* ovate lanceolate, 5in. to 6in. by 2in., glabrous. Bogota, 1881. (G. C. n. s. 17, p. 77.)

B. Williamsii (Williams's).* *fl.* rose-coloured, about 2in. long, elongate funnel shape; disposed in a compound umbellate cyme. *l.* lanceolate, very acute, and tapering to a very short twisted petiole. New Grenada, 1882.

BOMBACEÆ. A division of *Sterculiaceæ*.

BOMBAX (from *bombax*, one of the Greek names for cotton; the pods are filled with a fine silky substance like cotton, but which it is impossible to spin into thread, in consequence of the edges being perfectly smooth). Silk Cotton Tree. ORD. *Malvaceæ*. A genus of large soft-wooded stove trees. Flowers scarlet or white, large, usually rising laterally from the trunk or branches, either singly or in clusters. They grow best in a rich loamy soil. Cuttings, not too ripe, taken off at a joint, placed in sand under a bell glass, in moist heat, will root readily; but plants raised from seeds brought from their natural habitats make finer trees.

B. Ceiba (Ceiba). *fl.* pale red, large. *l.* palmate, with five leaflets. *fr.* turbinate, concave at the apex. *h.* 100ft. South America, 1692.

BOMBYX NEUSTRIA. *See* **Lackey Moth**.

BONA-NOX. *See* **Ipomæa Bona-Nox**.

BONAPARTEA. *See* **Tillandsia**.

BONAPARTEA JUNCEA. A synonym of *Agave geminiflora*.

BONATEA. (in honour of M. Bonato, a distinguished Italian botanist, and a Professor of Botany at Padua). ORD. *Orchideæ*. A handsome terrestrial stove orchid, allied to *Habenaria*, and requiring similar culture.

B. speciosa (showy).* *fl.* white, galeate; petals bipartite; raceme many-flowered, compact; bracts cucullate, acuminate. August. *l.* oblong, sub-undulate. Stem leafy. *h.* 2ft. Cape of Good Hope, 1820. (B. M. 2926; L. B. C. 284.)

BONGARDIA. (named after Heinrich Gustav Bongard, a German botanist). ORD. *Berberideæ*. A very pretty hardy tuberous-rooted perennial, requiring a sandy soil, and good drainage, with protection at all seasons from excessive wet, otherwise it will rot. It should be carefully planted in a compost of loam, peat, leaf soil, and sand, in equal proportions, and covered with a handlight.

B. Rauwolfii (Rauwolf's). *fl.* golden yellow, on pyramidal branched panicles; stamens and petals nearly

equal in length. May. *l.* radical, pinnate; leaflets sessile, oval-oblong, three to five-cleft at the apex, glaucous, each with a dark purple blotch at the base. *h.* 6in. Syria, Persia, 1740. SYN. *Leontice Chrysogonum*. (B. M. 6244.)

BONNAYA (named after Bonnay, a German botanist). ORD. *Scrophulariaceæ*. A small genus of usually glabrous, rarely pilose, slender, creeping or erect, annual, biennial, or perennial stove plants, almost unknown in cultivation. Flowers axillary, opposite, or alternate from abortion, usually pedicellate, the upper ones sometimes racemose, pinkish, or blue. Leaves opposite, quite entire, or toothed. They thrive in a rich sandy loam. The annual species are propagated by seeds, the others by divisions and cuttings.

BONNETIA (commemorative of Charles Bonnet, a French naturalist, who wrote some botanical papers in 1754). ORD. *Ternstrœmiaceæ*. A genus of elegant middle-sized stove trees or shrubs. Flowers large, terminal; peduncles one or many-flowered. Leaves scattered, exstipulate, coriaceous, entire, one-nerved, marked with transverse veins, sub-sessile, narrowed to the base. They thrive well in a mixture of loam and peat. Cuttings of firm young shoots will root if placed in sand under a hand glass, in a moderate heat.

B. sessilis (stalkless). *fl.* purplish, terminal. *l.* oblong, coriaceous, entire. *h.* 15ft. Guiana, 1819.

BORAGE. *See* **Borago officinalis**.

BORAGINACEÆ. A large order of herbs or shrubs, having spirally-coiled inflorescence; corolla usually regular and five-lobed, with an imbricated æstivation; throat generally hairy; stamens five, inserted in the corolla. Leaves alternate, rough. Among other genera belonging to this order may be named *Anchusa*, *Borago*, *Cynoglossum*, *Echium*, *Lithospermum*, and *Myosotis*.

BORAGO (derivation very uncertain; probably a corruption of some eastern name). Borage. ORD. *Boraginaceæ*. A genus of hardy herbaceous perennials or annuals, excellently adapted for naturalising in dry stony places. Flowers blue, panicled, drooping; corolla rotate; throat furnished with emarginate vaulted processes; anthers distinct, oblong or lanceolate, awned, fixed by the inner side, conniving into a cone. Nuts four, one-celled, turbinate, fixed to the bottom of the calyx. Leaves oblong or lanceolate. All the species are easily cultivated, thriving in any common soil. Propagated by divisions, in spring, or by striking the young cuttings in a cold frame. They may also be raised from seed, which should be sown from March to May, in any good garden soil, and the plants, when large enough, thinned out to 1ft. or more apart. In hot weather, Borage is generally in demand for claret cup and other drinks.

B. laxiflora (loose-flowered).* *fl.* on long pedicels, racemose, drooping; corolla pale blue; segments ovate, bluntish, erectly spreading. May to August. *l.* oblong, and rough from strigæ; radical ones rosulate; cauline ones half stem-clasping. Stem decumbent, many from the same root, hispid from retrograde bristles.

Corsica, 1813. (B. M. 1789.)

B. longifolia (long-leaved).* *fl.* disposed in a terminal bracteate panicle; corolla blue; segments ovate, acute, spreading. July and August. *l.* linear-lanceolate, scabrous and downy beneath; cauline ones half stem-clasping. *h.* 1ft. Numidia, 1825.



Fig. 265. Flower of Borago officinalis.

B. officinalis (officinal).* Common Borage. *fl.* blue, purple, or white; segments of the corolla limb ovate, acute, spreading. June to September. *l.*, lower ones obovate, attenuated at the base; cauline ones oblong, sessile, sub-cordate at the base. *h.*

1ft. to 2ft. Britain. This is the kind most cultivated in gardens for flavouring. See Fig. 265. (Sy. En. B. 36.)

BORASSUS (a name applied by Linnæus to the spathe of the Date Palm). ORD. *Palmaceæ*. A very small genus of stove trees, containing two noble species, which are distinguished by unisexual flowers, produced upon distinct plants, the males being borne in dense branching catkins, and the females on simple, or, more rarely, slightly branched spikes. Fruit very large, brown, three-seeded. Leaves fan-shaped, with spiny petioles. Trunks unarmed, often 70ft. high. They may be grown in good fibrous loam, leaf mould, and sand, mainly the former. Increased by seeds only, which require to be sown in strong bottom heat. Rarely seen in cultivation.

B. æthiopicum (African). *l.* nearly circular, and plaited, supported upon stout petioles, 6ft. to 7ft. long. Western Tropical Africa. This handsome, but rare, species is remarkable for the bulging out or swelling in its stem, near the middle, or about two-thirds of its height from the ground.

B. flabelliformis (fan-shaped).* *l.* nearly circular, and plaited like a partially-open fan, with about seventy ribs, which radiate from a common centre. *h.* 30ft. India, 1771.

BORBONIA (named after Gaston de Bourbon, Duke of Orleans, son of Henry IV. of France, a great lover

and patron of botany). ORD. *Leguminosæ*. A genus of very ornamental greenhouse evergreen shrubs, natives of the Cape of Good Hope. Flowers yellow, disposed in terminal heads, axillary. Leaves simple, amplexicaul, alternate, exstipulate, pungent. They thrive well in a mixture of peat, loam, and sand, with good drainage. Cuttings, half-ripened, obtained in April, will root freely in sandy soil if placed under a bell glass, in a cool house.

B. barbata (bearded).* *fl.* sessile, villous on the outside. July. *l.* narrow, lanceolate, many-nerved, complicated, ciliately-bearded, and very much acuminated; branches diverging. *h.* 3ft. to 4ft. 1823.

B. cordata (heart-shaped). *fl.*, corolla densely villous, with the vexillum obcordate. July. *l.* cordate, many-nerved, quite entire, glabrous. Branches villous. *h.* 3ft. to 6ft. 1759.

B. crenata (crenated).* *fl.* less villous than in the rest of the species. July. *l.* cordate, roundish, acute, denticulated, many nerved and reticulated between the nerves, and are, as well as the branches, glabrous. *h.* 3ft. to 6ft. 1774. (B. M. 274.)

B. lanceolata (lance-shaped). *fl.* densely villous. July. *l.* ovate-lanceolate, pungent, many nerved, quite entire, sessile, glabrous, as well as the stem. *h.* 2ft. to 3ft. 1752. (L. B. C. 81.)

B. ruscifolia (Ruscus-leaved). *fl.* sparingly villous. July. *l.* cordate, many-nerved, minutely ciliated, but are otherwise glabrous as well as the branches. *h.* 2ft. to 4ft. 1790. (B. M. 2128.)

BORDERS, FLOWER. Small beds, or a continuous bed, of greater length than width, skirting a wall or shrubbery, and containing plants of a heterogeneous character. They should be slightly raised above the surrounding level, and thoroughly drained. In the first preparation of the Border, it is most essential to deeply dig or trench the ground, thoroughly incorporating a large amount of well-bodied manure; and if the soil is very stiff, wood ashes or coarse sand should be well worked in with the manure. The best time to plant such Borders is in early autumn or in March.

Where, as is frequently the case, the Borders are only 2ft. or 3ft. wide, not more than two rows of plants, either in groups or singly, will be allowable. The tall plants or shrubs should constitute the background, with dwarfer subjects in front; but formal arrangements must be avoided. The object should be to secure a continuous succession of flowers. This would entail some little trouble at first, which, however, would be amply repaid by results.

No hard-and-fast rules can be laid down as to the arrangement of the plants, which depends on individual taste and means; but the best results are obtained when the border is mainly made up of hardy herbaceous perennials, as permanent occupants, assisted by liberal quantities of summer bedding plants, such as Dahlias, Fuchsias,

Geraniums, Heliotrope, Tropæolums, &c., as well as many hardy annuals and biennials. By this means, a very varied and beautiful display may be maintained, especially if bulbs are used for early spring effect, such as Narcissi, Scillas, Snowdrops, Tulips, &c. Of course, the herbaceous perennials should be selected with much care, all weedy subjects being avoided, and variety in colour and time of flowering secured. Anything like a full list of these would occupy too much space for repetition here, but the following will be found very showy and useful: Achilleas, Aconitums, Anemones, Aquilegias, Armerias, Asters, Campanulas, Carnations and Picotees, Delphiniums, Dodecatheons, Doronicums, Fritillarias, Funkias, Gaillardias, Geraniums, Geums, Hollyhocks, Iberises, Irises, Liliums, Pæonies, Papavers, Pyrethrums, double and single, Ranunculus, Trolliuses, &c.

BORDERS, FRUIT. These should be well drained, and if not naturally so, the soil should be excavated from 3ft. to 5ft. deep, in order to form a bottom of stones, pieces of brick, clinkers, &c. Where it is convenient, draining pipes should be added, if an outfall in the vicinity can be secured. The base of the Border should be sloped to the front, where the pipes should be laid, and the bottom covered with draining material, thereby effectually preventing the fruit trees rooting deep, which is detrimental to healthy growth. Gross-feeding vegetables or flowers should not be grown on the surface, but shallow-rooting crops will generally do no harm. Many advocate the surface being kept free from crops of any sort, simply letting it be freely exposed; whilst others equally as strenuously condemn this plan. Where necessary, chalk or some other mineral constituent of good soil which is naturally absent, may be added; but much animal manure is rarely required. The depth and

width of Border may vary for different fruit trees, but efficient drainage is in all cases important.

BORECOLE (*Brassica oleracea fimbriata*). An important division of the Brassica tribe, often cultivated in gardens under the name of Kale. It comes in very useful when hard weather has rendered cabbages, &c., unfit for use, as it endures cold better than most other green vegetables. Some are also grown as ornamental foliaged plants. Like all other plants of a similar description, they require rich soil, and they should be put out in June or early in July, as it is almost useless to plant this kind of vegetable after the middle of the latter month. To obtain the best results, the ground should be deeply dug and well manured; but it must not be full of crude manure at planting time, or it will make the plants too tender and succulent in wet seasons, with the result that the first sharp frost would cause them to rot. Good hard-stemmed plants are the kinds most needed, especially for crops required in spring, when green vegetables are scarce. Cultivation: Early in April, and again a month later for succession, the seeds should be sown thinly in nursery beds, not covering them too deeply. The soil should be in a friable condition, and it is an advantage if the first beds be made under a south wall. As soon as the seedlings appear, if they are too thick, they should be thinned, as those which are drawn up weak and spindly are useless. When large enough, they should be carefully planted out, choosing showery weather, if possible, for the operation. If it is necessary to plant them in dry weather, they must be well watered-in. The rows should be from 2ft. to 3ft. apart, according to the variety, and the plants 2ft. apart in the rows; or, if potatoes are planted wide apart, the Borecole may be arranged between them.

Dead leaves must be cleared away from time to time, but no green ones should be broken off. When the tops are cut for use, the stems should not be denuded of foliage, as they will soon break again and form successional crops. The plants must be kept free from weeds. After April, the Kales are of little use; the stems may therefore be pulled up, and the ground planted with some other crop. They all require the same treatment, and at their various seasons come in equally useful.

Sorts. The distinct forms are somewhat limited, but being largely cultivated on the Continent as well as all parts of Britain on account of its hardy nature, the varieties of Borecole receive a large number of names that are either synonymous with, or indistinct from, a few well-known types. Dwarf Green Curled or Scotch is probably the best and most grown; other good hardy sorts are Asparagus Kale (this name is applied to several different kinds, the best one being in use very late in spring), Buda, Cottagers', Dwarf Purple, Imperial Hearting, Ragged Jack, and Tall Green Curled. Melville's Variegated and Variegated Borecole, amongst others, have fine ornamental foliage.

BORONIA (named after Francis Boroni, an Italian servant of Dr. Sibthorp, who perished from an accident at Athens; he collected specimens of many of those plants which are figured in the "Flora Græca"). ORD. *Rutaceæ*. Very elegant and useful shrubs, requiring similar treatment to ordinary greenhouse hard-wooded subjects, and much aided with a little extra heat in spring, when breaking into growth. Flowers pretty, pink-purplish, or white; peduncles terminal, but usually axillary on the extreme branches, one to many-flowered; pedicels

furnished at the base and middle with two opposite, short bracts, jointed, commonly dilated under the calyx. Leaves opposite, simple, or impari-pinnate, entire, or a little serrulated, full of pellucid dots. They should be placed out of doors from July to the middle of September; the most convenient place for them is in pits, as there are then greater facilities for protecting them from heavy rains and thunderstorms. When first put out, Boronias should not be fully exposed, but in the course of a week they may remain open to the full influence of both sun and air. Potting should be performed once a year, as soon as the top growth ceases, as the roots then extend themselves in preparation for their next year's functions. The best compost for them is one of peat and maiden loam in equal parts, and about one-sixth sharp silver sand. Many cultivators, however, prefer a compost consisting of good fibry peat and silver sand, together with some pieces of charcoal, smaller or larger, according to the size of the pots used. The soil should be rammed firmly in the pots, which must be well drained. The leading shoots should be pinched, to ensure good bushy specimens. Propagation may be effected by young cuttings, or those made from the half-ripened wood; these should be put into a thoroughly drained pot of sandy soil, with 1in. of sand on the surface, and covered with a bell glass, which must be frequently taken off and wiped dry. When in the cutting state, water must be very carefully given around the rim of the pot, without taking off the glass. If placed in a temperature of about 50deg., and shaded from bright noonday sun, they soon root, when they may be potted off singly into small pots, and plunged in sawdust, or cocoa-nut fibre refuse, in which situation but little water is needed. Pinching repeatedly, when

young, is the only means to secure good ultimate growth. Air must be given on all possible opportunities.

B. alata (winged). *fl.* pale rose-colour, small; peduncles dichotomous, usually three-flowered; bracts fringed. May. *l.*, leaflets three to five pairs, or more, crenate, revolute, pilose on the nerves beneath, as well as the rachis. *h.* 2ft. to 6ft. New Holland, 1823. (L. B. C. 1833.)

B. anemonifolia (Anemone-leaved). *fl.* pink; peduncles axillary, solitary, one-flowered. May. *l.* stalked, trifid; segments narrow, wedge-shaped, furnished with two or three teeth at the apex, or quite entire. *h.* 1ft. to 3ft. New Holland, 1824. (P. M. B. 9, 123.)

B. crenulata (crenulate).* *fl.* red, small, with a fringed calyx; pedicels axillary and terminal, one-flowered. July. *l.* obovate, mucronulate, crenulated. *h.* 1ft. to 4ft. King George's Sound. (B. M. 3915.)

B. denticulata (finely-toothed). *fl.* rose-coloured; bracts deciduous; peduncles corymbose. March to August. *l.* linear, retuse, toothleted, terminated by a small point. *h.* 2ft. to 6ft. King George's Sound, 1823. (B. R. 1000.)

B. Drummondi (Drummond's).* *fl.*

pretty rosy pink, freely produced during spring and summer. *l.* pinnatifid. *h.* 2ft. New Holland. A very pretty species, with a slender but compact habit of growth. There is a white-flowered variety of this species (F. d. S. 9, 881.)

B. elatior (tallest).* *fl.* pendulous, rosy carmine, very fragrant, disposed in long dense clusters along the ends of the branches. May. *l.* very prettily pinnately cut into linear segments. *h.* 4ft. Western Australia, 1874. (B. M. 6285.)

B. ledifolia (Ledum-leaved). *fl.* red; peduncles axillary, one-flowered, each bearing two bracts in the middle. March. *l.* linear-lanceolate, quite entire, downy beneath. *h.* 1ft. to 2ft. New Holland, 1814. (P. M. B. 8, 123.)



Fig. 266. Flowering Branches of Boronia megastigma.

B. megastigma (large-stigma).* *fl.* numerous, axillary, fragrant, drooping, ½in. in diameter, subglobose, campanulate; petals nearly orbicular, concave, maroon purple outside, and yellow within. *l.* sessile, pinnate, with three to five narrow linear rigid leaflets. *h.* 1ft. Of slender

habit, with twiggy branches. South-western Australia, 1873. See Fig. 266.

B. pinnata (pinnate).* *fl.* pink, with a scent like that of Hawthorn; peduncles dichotomous. February to May. *l.*, leaflets two, three or four pairs, linear, acute, quite smooth. *h.* 1ft. to 3ft. New Holland, 1794. (B. M. 1763.)

B. polygalæfolia (Polygala-leaved). *fl.* red; peduncles axillary, solitary, one-flowered. March to July. *l.* linear-lanceolate, quite entire, opposite, alternate, and three in a whorl. *h.* 1ft. to 3ft. Port Jackson, 1824.

B. serrulata (serrulate).* *fl.* of a deep rose colour, very fragrant; peduncles aggregate, terminal. July. *l.* trapeziform, acute, serrulated in front, smooth, full of glandular dots. *h.* 1ft. to 6ft. Port Jackson, 1816. (B. R. 842.)

B. tetrandra (four-stamened). *fl.* pale purple; pedicels short, one-flowered. May. *l.* impari-pinnate; leaflets four to five pairs, linear, obtuse, smooth; branches pilose. *h.* 1ft. to 4ft. New Holland, 1824. (P. M. B. 16, 227.)

BORRERIA (named after William Borrer, F.L.S., a profound botanist and cryptogamist). ORD. *Rubiaceæ*. A large genus of stove herbs or sub-shrubs, now

referred to *Spermacoce*. Flowers small, white, rarely blue, disposed in verticillate heads, in the axils of the leaves, or on the tops of the branches, rarely cymose or corymbose. Leaves opposite, or the young ones disposed in fascicles in the axils of the old ones, and therefore appearing verticillate; stipules joining with the petioles, more or less sheathing, fringed by many bristles. Stems and branches usually tetragonal. The species are of easy culture, thriving in a light soil. Cuttings of the perennial kinds strike root readily in the same kind of soil, in heat. The annual kinds require a similar treatment to other tender annuals.

B. stricta (straight). A dwarf shrub, but closely allied to the next species. Porto Rico.

B. verticillata (whorled-flowered). *fl.* white. July. *l.* linear lanceolate, acuminated, opposite, but appearing verticillate from the fascicles of young leaves in the axils. *h.* 2ft. West Indies, 1732.

BOSCIA (named after Louis Bosc, a French professor of agriculture). SYN. *Podoria*. ORD. *Capparidaceæ*. A small genus of stove plants, requiring a soil of lumpy, fibry loam and peat. Propagated by cuttings of firm wood, placed in sand, under a glass, in heat.

B. senegalensis (Senegal). *fl.* white, small, apetalous, corymbose. *h.* 3ft. Senegal, 1824. An unarmed evergreen shrub. (L. E. M. 395.)

BOSSIÆA (named after M. Bossier Lamartinière, a French botanist, who accompanied the unfortunate

La Peyrouse round the world). ORD. *Leguminosæ*. A genus of elegant Australian greenhouse shrubs. Flowers yellow, axillary and solitary, the base of the vexillum or the keel generally blotched or veined with purple. Leaves simple, of various forms. A mixture of turfy loam, leaf mould, peat, and sand, with very free drainage, suits these plants best. Half-ripened cuttings will root freely if placed in a pot of sand with a bell glass over them, in a cool house. Seeds should be sown, in March, on a slight hotbed.

B. cinerea (ashy-grey). *fl.* yellow, the vexillum furnished with a purple circle at the base, and the keel dark purple. May. *l.* nearly sessile, cordate acute, ending in a spiny mucrone, scabrous above, but pilose on the nerves beneath, with recurved margins. Branches terete, crowded with leaves, vinous. *h.* 1ft. to 3ft. 1824. SYNS. *B. cordifolia*, *B. tenuicaulis*. (B. M. 3895.)

B. cordifolia (heart-leaved). A synonym of *B. cinerea*.

B. disticha (two-ranked).* *fl.* yellowish-red; peduncles solitary, axillary, one-flowered, longer than the leaves. March to May. *l.* distichous, ovate, obtuse. Young branches terete. *h.* 1½ft. Swan River, 1840. (B. R. 1841, 55.)

B. ensata (sword-shaped). *fl.* yellowish, with the back and base of the vexillum of a brownish orange-purple colour; keel brownish-purple.

April. Branches flat, linear, leafless, toothed, the teeth bearing the flowers; upper bracts distant from the lower ones, shorter than the pedicel. *h.* 1ft. to 2ft. 1825. (S. F. A. 51.)

B. foliosa (leafy). *fl.* yellow and orange. May to June. *l.* alternate, small, orbicular, retuse, scabrous, with revolute margins, silky beneath; stipules permanent, hooked, longer than the petioles. Branches straight, terete, villous. *h.* 1ft. to 3ft. 1824.

B. lenticularis (lentil-leaved). A synonym of *B. rhombifolia*.

B. linnæoides (Linnæa-like).* *fl.* yellow; keel dark brown; corolla about twice the length of the calyx; pedicels solitary one-flowered, elongated. May. *l.* elliptic, mucronate. Branches terete, prostrate, puberulous. 1824. A procumbent shrub.

B. linophylla (Flax-leaved).* *fl.* orange and purple. July to August. *l.* linear, with recurved margins. Branches compressed, leafy. *h.* 1ft. to 4ft. 1803. (B. M. 2491.)

B. microphylla (small-leaved). *l.* cuneiformly obcordate, glabrous. Branches terete, leafy, spinescent; young branches rather compressed and pubescent. *h.* 1ft. to 2ft. 1803.

(L. B. C. 656.)

B. rhombifolia (diamond-leaved).* *fl.* yellow, the vexillum having a dark red zonate mark at the base; wings red at the base; keel brownish-purple. April. *l.* rhomboidal-orbicular, somewhat emarginate and mucronate. Branches terete; branchlets compressed, leafy. *h.* 1ft. to 3ft. 1820. SYN. *B. lenticularis*. (L. B. C. 1238.)

B. rotundifolia (round-leaved). *l.* roundish, or broadly obovate, somewhat mucronate, flat, four to five lines long and five to six broad. Branches and branchlets leafy, compressed. *h.* 1ft. to 2ft. 1824.

B. scolopendrium (plank-plant). *fl.* yellow, with the back of the vexillum and keel brownish-red. May. *l.* (when present) ovate and smooth. Branches flat, linear, leafless, toothed, with the teeth bearing the flowers; keel naked; superior bracts permanent, imbricate, equal in length to the peduncles. *h.* 3ft. to 10ft. 1792. (B. M. 1235.)

B. tenuicaulis (slender-stemmed). Synonymous with *B. cinerea*.

BOSWELLIA (named after Dr. Boswell, formerly of Edinburgh). Olibanum Tree. ORD. *Burseraceæ.* Ornamental and economic evergreen stove trees. Flowers hermaphrodite; calyx five-toothed,

permanent; petals five, obovate-oblong, spreading, with the margins incumbent in æstivation; disk cup-shaped, crenate; stamens ten; capsule trigonal. They are of easy culture, thriving well in loam and peat soil. Cuttings root readily if placed in sand under a glass.

B. glabra (glabrous). *fl.* white, small, with a red nectary and yellow anthers; racemes aggregate, simple, terminal, shorter than the leaves. *l.* impari-pinnate; leaflets broad, lanceolate, blunt, serrated, smooth. *h.* 30ft. Coromandel, 1823. (B. F. S. 124.)

B. serrata (saw-edged-leaved).* *fl.* whitish-yellow; racemes axillary, simple. *l.* impari-pinnate; leaflets ovate-oblong, taper-pointed, serrated, pubescent. *h.* 20ft. India, 1820. (T. L. S. xv., 4.)

BOTANY BAY GUM. *See* **Xanthorrhæa arborea**.

BOTANY BAY TEA (and **TREE**). *See* **Smilax glycyphylla**.

BOTHY. A residence for under-gardeners, usually built behind the hothouses, or some high wall, in what is called a back shed. The place is too frequently a cramped, ill-ventilated hovel. A Bothy proper should be an independent structure, and fitted with modern conveniences; for, of all people, gardeners are the most susceptible to colds, &c. A library of standard horticultural and botanical works, as well as a few on other scientific subjects, and a moderate number of high-class books of fiction, one

or more weekly gardening and other papers, should be supplied by the employer. During the winter months, for mutual improvement, lectures should be delivered, or papers read, by each gardener, on various subjects, after which a free discussion should take place upon the paper or lecture, by which means a great amount of good would be accomplished.

BOTRYCHIUM (from *botrys*, a bunch; in reference to the bunch-like disposition of the indusia). Moonwort. ORD. *Filices*. A genus of very interesting and pretty little hardy ferns. Capsules sessile, arranged in two rows on the face of spikes which form a compound panicle. They require a compost of sandy loam; perfect drainage is most essential. For general culture, *see* **Ferns**.

B. australe (southern). A variety of *B. ternatum*.

B. daucifolium (Daucus-leaved). *sti.* stout, 6in. to 12in. long; petiole of sterile segments 1in. to 6in. long, the latter 6in. to 12in. each way, deltoid, tripinnatifid or tripinnate, the lower pinnæ largest; segments lanceolate-oblong, ¼in. to ⅜in. broad, finely toothed. *fertile peduncle* equalling the sterile segments when mature; panicle 2in. to 4in. long; tripinnate, not very close. Himalayas, &c. Greenhouse species. SYN. *B. subcarnosum*.

B. Lunaria. Common Moonwort.* *sti.* 1in. to 4in. long. *sterile segments* sessile, or nearly so, 1in. to 3in.

long, ½in. to 1in. broad, base much broader than the middle, cut down to a flattened rachis into several distinct, close, entire, or notched cuneate-flabellate pinnæ on both sides. *fertile peduncle* equalling or exceeding the sterile portion; panicle close, 1in. to 2in. long. England, &c. Hardy. See Fig. 267.

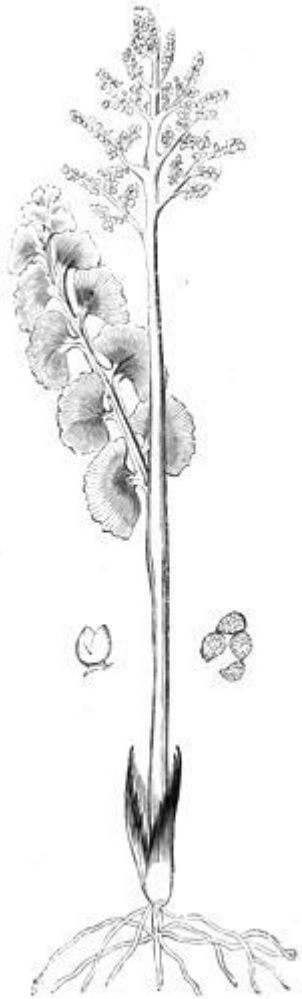


FIG. 267. BOTRYCHIUM LUNARIA, showing Habit, Capsule, and Spores.

B. lunarioides (Lunaria-like). A variety of *B. ternatum*.

B. obliquum (oblique). A variety of *B. ternatum*.

B. subcarnosum (sub-fleshy). A synonym of *B. daucifolium*.

B. ternatum (ternate).* *sti.* 1in. to 2in. long. *petiole* of the sterile segments 2in. to 4in. long, the latter 3in. to 6in. each way, deltoid, tri- or quadripinnatifid; lower pinnæ much the largest. *fertile peduncle* 6in. to 9in. long; panicle 1in. to 6in. long; deltoid, very compound. Nootka and Hudson's Bay territory. Several so-called species come very close to this, including *australe*, *lunarioides*, and *obliquum*, which are only geographical varieties. Greenhouse species.

B. virginianum (Virginian).* *sti.* 3in. to 18in. long. *sterile segments* sessile, 4in. to 12in. each way, deltoid, quadripinnatifid; lower pinnæ much the largest; pinnules oval-oblong, close, cut down to the rachis into finely cut linear-oblong segments. *fertile peduncle* equalling or exceeding the sterile part of the plant when mature; panicle 1in. to 4in. long, loose, oblong. Oregon, and North United States, 1790. A hardy species in sheltered places. (H. G. F. 29.)

BOTTLE-GOURD. *See* **Lagenaria**.

BOTTLE-TREE. *See* **Sterculia rupestris**.

BOTTOM HEAT. This is usually secured by passing hot-water pipes through an air chamber, or a water

tank, beneath a bed of plunging material. The covering of the tank or chamber is best made of slate. The heat must be regulated according to the requirements of the subjects grown; this is easily accomplished by using the valve. A thermometer should be placed in the tank or bed. Bottom-heat is indispensable for propagating plants from seeds and cuttings, especially in spring. *See* **Heating** and **Hotbeds**.

BOUCEROSIA (from *boukeros*, furnished with buffaloes' horns; in reference to the curved lobes of the corona) ORD. *Asclepiadaceæ*. A genus of greenhouse succulent perennials, allied to *Stapelia*, and requiring the same culture. Flowers numerous, terminal, umbellate; corolla sub-campanulate, five-cleft; segments broadly triangular, with acute recesses; stramineous corona fifteen-lobed; lobes disposed in a double series; the five inner ones opposite the stamens and lying upon the anthers; the rest exterior, erect, or a little incurved at apex, adhering to the back of the inner ones. Branches and stems tetragonal, with toothed angles.

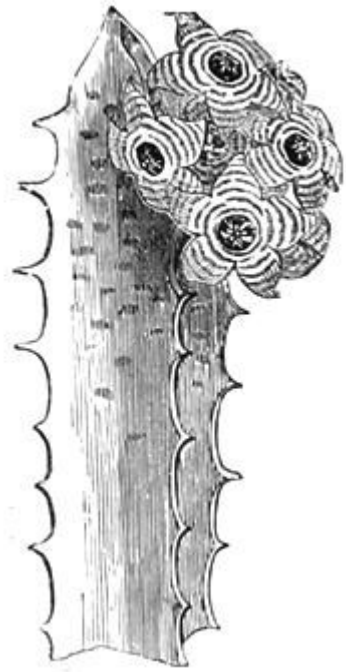


FIG. 268 BOUCEROSIA EUROPÆA.

B. europæa (European). *fl.* purple-brown, yellow. Summer. *h.* 4in. Sicily, 1833. SYNS. *Apteranthes* and *Stapelia Gussoniana*. See Fig. 268. (B. R. 1731.)

B. maroccana (Morocco).* *fl.* dark red purple, with yellow concentric lines. Summer. *l.* minute, trowel-shaped, deflexed at tip of stem angles. *h.* 4in. Morocco, 1875. (B. M. 6137.)

BOUCHEA (named after C. and P. Bouche, German naturalists). ORD. *Verbenaceæ*. A small genus of stove or greenhouse evergreen herbs or sub-shrubs.

Flowers sub-sessile, in spicate racemes, which are either terminal or in the forking of two branches; corolla funnel-shaped. Leaves opposite, toothed. They thrive in a well-drained compost of loam and sandy peat. Propagated by cuttings, placed in sand, under a glass, and in a gentle heat, during spring.

B. cuneifolia (wedge-shaped-leaved). *fl.* white. April. *h.* 4ft. Cape of Good Hope, 1821. A greenhouse evergreen shrub. SYN. *Chascanum cuneifolium.*

B. pseudogervao (false-gervaô). *fl.* purplish, with white throat; spike terminal, 6in. to 10in. long, slender. September. *l.* opposite, ovate, or elliptic-ovate, acuminate, serrated. Stems tetragonous. *h.* 2ft. to 5ft. Brazil, 1874. A stove perennial. (B. M. 6221).

BOUGAINVILLEA (named after De Bougainville, a French navigator). ORD. *Nyctagineæ*. Gorgeous warm greenhouse or conservatory plants, comprising some of the most showy climbers in cultivation. Their beauty lies in the bracts, which envelop the small greenish flowers. *B. glabra* may be grown in pots, or planted out in the greenhouse borders; the others are best planted out, as they root very freely, and plenty of space would be occupied if allowed, but it is best to limit it, as they bloom much better. Strict training and pinching are not desirable, being prejudicial to the free production of bloom; indeed, the best plan is to allow the plants to ramble freely over the roof of a moderately high house, or along the upper portion of a back wall; they will then bloom profusely for

several months in the year, provided proper attention be paid to watering, and that the plants are in a well-drained situation. In preparing a border for their reception, the first point to be considered is the drainage, which must be perfect. This is best effected by placing a layer of brick rubbish, 6in. to 9in. in thickness, communicating with the drain, by which means all sourness and stagnancy of the soil will be obviated. The bed should be excavated to a depth of 18in. or 2ft. Three parts turfy loam, and one part leaf soil, with the admixture of a liberal quantity of sharp gritty sand, will form a suitable compost for the culture of Bougainvilleas. The amount of sand incorporated must depend upon the quality of the other components, heavy loam requiring more than that which is more friable. The occasional incorporation of manure in the compost is not to be recommended; but a liberal application of liquid manure will be of material advantage, especially if the root space is limited. When the plants cease blooming each year—about November or December—they should be dried off and rested; and in February they should be closely spurred in, the same as with vines, and all weak leaders removed, so that strong wood only is left. When grown in pots, they must be started in brisk heat. They are easily increased by cuttings prepared from the half-ripened wood; these should be placed in sandy soil, in a brisk bottom heat, when they will soon root. Scale, red spider, and mealy bug are the only insects likely to infest the plants, and recipes for their destruction will be found under each individual name.



FIG. 269. FLOWERING BRANCH OF BOUGAINVILLEA SPECT

B. glabra (smooth).* *fl.*, inflorescence panicled, smaller than that of *B. speciosa*, each branchlet producing cordate-ovate acute rosy bracts, in threes. Summer. *l.* bright green, smooth. Brazil, 1861. This is by far the best species for pot culture, and forms a very showy plant when well grown.

B. speciosa (beautiful).* *fl.*, bracts large, cordate, delicate lilac rose,

produced in immense panicles, which, in well grown specimens, are so freely produced as to entirely shroud the whole plant. March to June. *l.* ovate, very dark green, covered on the upper surface with small hairs. Stems branched, abundantly furnished with large recurved spines. Brazil, 1861. (F. M. i., 62.)

B. spectabilis (showy). *fl.*, bracts of a dull brick-red, shaded with scarlet. South America, 1829. It is very difficult to obtain bloom on this plant; and when flowers are produced, they are extremely ephemeral. The species is, for all practical purposes, much inferior to either of the foregoing. SYN. *Josepha augusta*. See Fig. 269.

BOURBON PALM. *See* **Latania**.

BOUSSINGAULTIA (named after Boussingault, a celebrated chemist). ORD. *Chenopodiaceæ*. Very pretty half-hardy, tuberous-rooted plants, requiring a rich vegetable sandy soil, and a well-drained sunny aspect, under which conditions the first-mentioned species develops into a very luxuriant trailing plant, attaining a length of 20in. or more. Propagated freely by means of the tubercles of the stem; these are, however, extremely brittle.

B. baselloides (Basella-like).* *fl.* white, ultimately becoming black, fragrant, small, disposed in clusters, 2in. to 4in. long, which are axillary

at the ends of the branches. Late autumn. *l.* alternate, cordate, smooth, shining, fleshy, slightly wavy. Stems very twining, tinged red, very quick-growing, producing tubercles. South America, 1835. (B. M. 3620.)

B. Lachaumei (Lachaume's). *fl.* rose, constantly in perfection. Cuba, 1872. A stove species.



Fig. 270. Flowering Branch of Bouvardia.

BOUVARDIA (named after Dr. Charles Bouvard,

formerly superintendent of the Jardin du Roi, at Paris). ORD. *Rubiaceæ*. Handsome greenhouse evergreen shrubs. Peduncles terminal, three-flowered, or trichotomous and corymbose; corolla funnel-shaped, tubular, elongated, beset with velvety papillæ outside, and a four-parted, spreading, short limb. Leaves opposite, or in whorls; stipules narrow, acute, adnate to the petioles on both sides. These extensively cultivated plants are among the most useful for conservatory or greenhouse decoration (see Fig. 270. for which we are indebted to Messrs. Cannell and Sons), and the flowers are largely employed in a cut state. Perhaps only two are fragrant, viz., *jasminiflora* and *Humboldtii*. Cultivation: Presuming the grower to be commencing with young rooted cuttings, these should be potted off into a mixture of good fibrous loam, leaf soil, and sand, in equal proportions, to which may be added a small quantity of peat; they should then be placed in a temperature of from 70deg. to 80deg. until fully established in the small pots. It is necessary at this stage to stop the young plants back to the first joint, and as they continue to make fresh breaks, to keep on pinching them back during the whole period of cultivation, or until sufficiently bushy plants are produced. Many growers neglect stopping far too much, the result being ill-shaped and almost flowerless plants. The pinching, of course, can be regulated by the time the plants are required to flower; and it is unwise, in most cases, to stop them after the end of August. When the small pots are well filled with roots, the plants should be shifted into the flowering pots, viz., large 48-sized, which are quite commodious enough to grow very fine plants, a similar compost as in the first potting, with a little Standen's manure added, being used, and good

drainage provided. A cool greenhouse, with a damp bottom for the pots to rest upon, and with a moist atmosphere, is the most suitable place in which to grow them during late spring and early summer, the moist air being very desirable as an effectual check to red spider, a pest very fond of the foliage, which it permanently disfigures. A cold pit or close frame is better during the summer months, as a moist atmosphere and cool bottom are then certain. Ventilation may be effected during the greater part of the day by tilting the lights below, and on fine nights they may be removed altogether. During bright sunshine, shading will be beneficial. All through the period of active growth, it is absolutely necessary that the plants should receive plenty of water, or they will surely suffer; and when the pots are filled with roots, occasional doses of manure water will be beneficial. Many cultivators plant them out about the end of June, in favoured situations, or in spent hotbeds, when they make very vigorous growth; and, if carefully pinched and watered, fine specimens are obtained. These are lifted in early autumn, with a good ball, potted, and kept shaded for a few days until the roots are again active, when they are taken to the house in which they are intended to bloom, and an enormous supply of flowers is secured. We have also seen Bouvardias planted out permanently in beds, in prepared pits, in which the winter temperature was not less than 55deg., with very satisfactory results; the quantity of bloom being very great. Of course, with the last-named treatment, it is essential to give the plants a rest and hardening-off after flowering, and when they are started into fresh growth to keep them well pinched and watered. Bouvardias are liable to the attacks of red spider and green fly. The former stands

little chance of existence if the plants are kept well supplied with moisture; the latter may be destroyed by fumigating with tobacco. Mealy bug are also troublesome, and should be sponged off with a solution of Gishurst's Compound. Propagation: After flowering, and a slight rest and hardening-off, the old plants should be cut back, placed in heat, in a stove or cucumber pit, and freely syringed, which will cause them to break freely, and produce a good supply of cuttings. When the young shoots are from 1½in. to 2in. long., they are in the best condition for striking. It is not necessary that they should be cut off at a joint, as they will root from any surface of the stem; and, working economically, it is wiser to cut them off just above the first joint, as other shoots will speedily break out, which may, in their turn, be taken. Pots about 5in. across should have previously been prepared for the cuttings, by being well drained and filled with a mixture of good fibrous loam, leaf soil, and coarse sand, in equal parts, with a copious supply of sand upon the surface, into which the cuttings should be dibbled pretty thickly. A good watering must be given without wetting, and thereby injuring, the foliage. The pots should be plunged in the cutting case, or in any bottom heat of about 70deg. or 80deg., and covered with a bell glass. All that is then necessary is to keep them moist and shady during sunshine, until they are rooted, which, as a rule, is effected in three weeks' time. When well established, they may be removed from the case, gradually hardened off, and finally potted singly into small thumb pots.

B. angustifolia (narrow-leaved).* *fl.* pale red; corymbs somewhat trichotomous. September. *l.* three in

a whorl, lanceolate, with revolute edges, glabrous above, but beset with fine hairs beneath. Branches terete, smoothish. *h.* 2ft. Mexico, 1838. (P. M. B. 7, 99.)

B. Cavanillesii (Cavanilles's). *fl.* red; peduncles terminal, trifid, three-flowered. May. *l.* opposite, ovate-lanceolate, acuminated, rather villous beneath. *h.* 1½ft. Mexico, 1846. SYN. *B. multiflora*. (J. H. S. 3, 246.)

B. flava (yellow).* *fl.* yellow, drooping; racemes three to five-flowered; pedicels downy, slender. March. *l.* opposite, ovate-lanceolate, ciliated; stipules setaceous. *h.* 1½ft. Mexico, 1845. (B. R. 32, 32.)

B. hirtella (hairy). *fl.* pale red or flesh-coloured, corymbose. *l.* whorled, lanceolate, with revoluted edges, hairy on both surfaces. Branches terete. Mexico.

B. Humboldtii corymbiflora (Humboldt's corymb-flowered).* *fl.* white, large, fragrant, disposed in terminal racemes; tubes long. Autumn and winter. *l.* ovate, oblong-acuminate, dark green. 1874. One of the finest kinds in cultivation. (G. C. 1873, 717.)

B. Jacquini (Jacquin's). A synonym of *B. triphylla*.

B. jasminiflora (Jasmine-

flowered).* *fl.* white, fragrant, in compound cymes; very floriferous. Winter. *l.* opposite, elliptic-acuminate. South America, 1869. A very charming and largely grown species. (G. C. 1872, 215.)



Fig. 271. Bouvardia leiantha.

B. leiantha (smooth-flowered).* *fl.* scarlet; corymbs sub-trichotomous.

July to November. *l.* ternate, ovate-acuminate, slightly hairy above, downy-villous beneath. *h.* 2ft. Mexico, 1850. See Fig. 271. (B. H. 2, 6.)

B. longiflora (long-flowered).* *fl.* white, terminal, solitary, sessile, with the tube 2in. or 3in. long. *l.* opposite, oblong, acute, cuneated at the base, glabrous. Branches compressedly tetragonal, glabrous. *h.* 2ft. to 3ft. Mexico, 1827. (B. M. 4223.)

B. multiflora (many-flowered). A synonym of *B. Cavanillesii*.

B. triphylla (three-leaved).* *fl.* scarlet, nearly 1in. long; corymbs somewhat trichotomous. July. *l.* smoothish above, hairy beneath, three in a whorl, oblong. Branchlets trigonal, hairy. *h.* 2ft. to 3ft. Mexico, 1794. There are numerous varieties of this species. SYN. *B. Jacquini*. (B. M. 1854.)

B. versicolor (various-coloured). *fl.*, corolla with a scarlet tube, which is ¾in. long, but having the limb yellowish inside; corymbs three-flowered, trichotomous, drooping. July to September. *l.* opposite, lanceolate, ciliated. Branches terete, glabrous, velvety while young. *h.* 2ft. to 3ft. South America, 1814. (B. R. 245.)

The garden hybrids are very handsome. A selection is given below:

ALFRED NEUNER, flowers double, white, or slightly tinged with rose (see Fig. 272); BRILLIANT, flowers bright crimson, numerous, freely branching habit, and strong constitution; DAZZLER,* habit very bushy and compact, extremely floriferous, flowers rich scarlet, in dense clusters; HOGARTH, brilliant scarlet, very fine; LONGIFLORA FLAMMEA,* flowers long-tubed, blush-rose; MAIDEN'S BLUSH,* very free and floriferous, blush-rose; PRESIDENT GARFIELD, rich double, red-pink, very fine; QUEEN OF ROSES, rosy-pink, the tubes tinted with crimson, habit dwarf and very free; VREELANDI (=DAVIDSONI), flowers pure white, produced in great abundance; one of the most useful of them all, and grown very extensively.



Fig. 272. Bouvardia Alfred Neuner.

BOWENIA (commemorative of Sir G. Bowen, Governor of Queensland). Ord. *Cycadaceæ*. A remarkable and handsome greenhouse fern-like plant, closely allied to *Zamia*, from which it is distinguished by having the leaflets decurrent to the petiole, instead of articulated, as in that genus. For culture, *see* **Cycas**.

B. spectabilis (showy).* *fl.*, male cones small, ovoid, ½in. to ¾in. long; female oblong-globose, 3¾in. long. *l.* bipinnatisect, on tall, slender petioles; leaflets falcate-lanceolate, decurrent; stem short, thick, cylindrical. Queensland, Australia, 1863. (B. M. 5398 and 6008.)

B. s. serrulata (finely-toothed).* This differs from the type in having the margins distinctly toothed or serrated. Rockingham Bay, 1863.

BOWIEA (named after J. Bowie, a botanical collector for the Royal Gardens, Kew). ORD. *Liliaceæ*. A very interesting greenhouse or half-hardy twining bulbous perennial, thriving in a sunny border, under the wall of a greenhouse, where it will require protection during winter. It does well in any light well drained soil, and may be propagated by seeds or offsets.

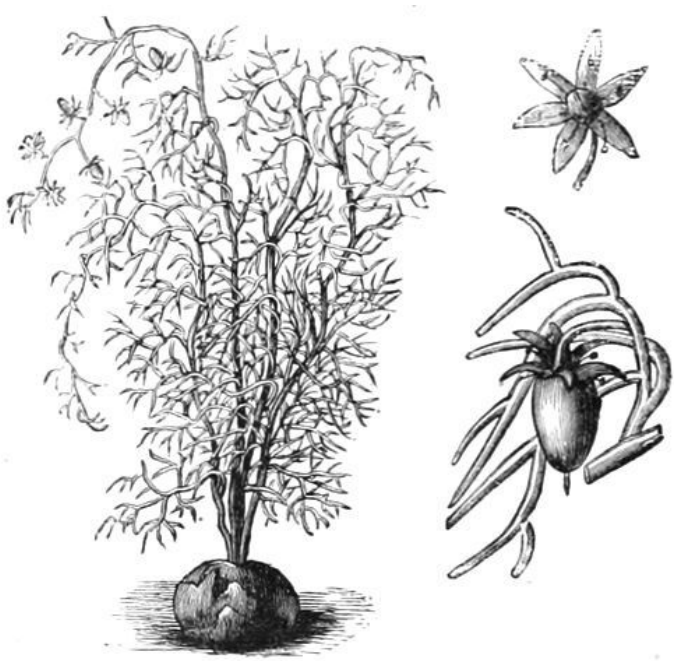


FIG. 273. BOWIEA VOLUBILIS, showing Habit, Flower, and Fruit.

B. volubilis (twining). *fl.* few, remote, pedicellate; perianth six-partite, persistent; segments equal, green, lanceolate, ¼in. long, at length reflexed. October. True leaves are frequently not developed for years; but the green, fleshy, mostly abortive inflorescence performs their functions. South Africa, 1866. See Fig. 273.

BOX. *See* **Buxus.**

BOX ELDER. *See* **Negundo**.

BOX THORN. *See* **Lycium**.

BRABEIUM (from *brabeion*, a sceptre; in reference to the racemosed flowers). African Almond. ORD. *Proteaceæ*. An ornamental greenhouse evergreen tree. For culture, &c., *see* **Banksia.**

B. stellatifolium (star-leaved). *fl.* white, sweet-scented, disposed in elegant, axillary, spiked racemes. August. *l.* whorled, simple, serrate. *h.* 15ft. Cape of Good Hope, 1731.

BRACHYCHITON (from *brachys*, short, and *chiton*, a coat of mail; plants covered with imbricated hairs and scales). ORD. *Sterculiaceæ*. A genus of tropical or sub-tropical Australian trees or shrubs, allied to *Sterculia*, from which it differs in very minor points. They are of easy culture in a loamy soil. Propagated by young cuttings, planted in sandy soil, in gentle heat.

B. acerifolium (Acer-leaved). *fl.* bright red. *l.* long-stalked, deeply five to seven-lobed. *h.* from 60ft. to 120ft.

B. Bidwillii (Bidwill's).* *fl.* bright red, arranged in axillary bunches. *l.* stalked, heart-shaped, entire, or three-lobed, and covered with a soft pubescence. 1851. (B. M. 5133.)

B. diversifolium (various-leaved). *l.* coriaceous, obtuse, lanceolate, entire, or three-lobed, glabrous; lobes acuminate. *h.* 20ft. to 60ft. 1824.

BRACHYCOME (from *brachys*, short, and *kome*,

hair). Swan River Daisy. ORD. *Compositæ*. A genus of beautiful little half-hardy perennials or annuals, closely resembling *Bellis* in structure. Involucral bracts membranous at the margin; receptacle pitted, naked. Fruit compressed, surmounted by a very short bristly pappus. *B. iberidifolia* is one of the prettiest of summer annuals, and in the open border it flowers profusely, if in a dry, sunny spot. Towards the autumn, it may be removed to the greenhouse, where it will still continue flowering for several weeks. Seeds may be sown in a gentle hotbed, early in the spring, and, when large enough, planted out in borders or beds, 6in. apart; or they may be sown thinly out of doors, late in April, and thinned out, when they will flower a month later than those sown in the hotbed.

B. iberidifolia (Iberis-leaved).* *fl.-heads* blue or white, with a dark centre, about 1in. in diameter. Summer and autumn. *l.* pinnate; segments linear. Plant erect, glabrous. *h.* 1ft. Swan River, 1843. See Fig. 274.



Fig. 274. Brachycome iberidifolia, showing Habit and Flowering Branch.

BRACHYLÆNA (from *brachys*, short, and *læna*, a cloak or covering; referring to the shortness of the involucre). Ord. *Compositæ*. A genus of South African evergreen greenhouse shrubs, nearly allied to *Baccharis*. They thrive in a compost of peat and loam. Propagated by cuttings, made of half-ripened shoots, placed in a well-drained pot of sandy soil, under a bell glass.

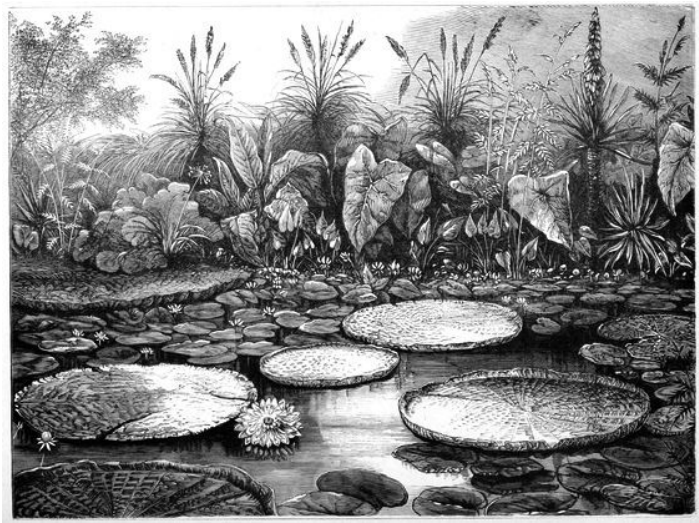
B. dentata (toothed). *fl.-heads* yellow. *l.* lanceolate, acute, entire, rusty beneath when young, when adult quite glabrous.

B. nerifolia (Nerium-leaved).* *fl.-heads* yellow, in branching racemes or panicles. August to November. *l.* lanceolate, serrated with one or two teeth forward. *h.* 2ft. Cape of Good Hope, 1752.

BRACHYOTUM (from *brachys*, short, and *otos*, the ear; in reference to the short appendages at the base of the anthers). ORD. *Melastomaceæ*. A handsome greenhouse evergreen shrub, with a bushy habit. Allied, and requiring similar culture, to *Pleroma* (which *see*).

> **B. confertum** (crowded).* *fl.* purple, terminal, nodding, with cream-coloured bracts. November. *l.* oblong or ovate, small, three-nerved, with adpressed hairs. Andes, Peru, 1873. (B. M. 6018.)

BRACHYSEMA (from *brachys*, short, and *sema*, a standard; the standard of the flower is very short). ORD. *Leguminosæ*. Elegant procumbent or climbing greenhouse, evergreen shrubs. Racemes axillary and terminal, few-flowered. Leaves alternate, oval or ovate, entire, mucronate, silky on the under surface. They thrive in a compost of peat, leaf soil, and loam, in equal proportions, made porous, if necessary, by the addition of sand. Increased by cuttings, made of half-ripened shoots in summer, placed in sandy soil, under a bell glass, in a gentle bottom heat; or by layers. Seeds may be sown in March, in heat. Brachysemas require thorough drainage, whether grown in pots or planted out. *B. latifolium* does best under the latter treatment, when it forms a magnificent climber for pillars or the roof.



THE GIANT WATER LILY (VICTORIA REGIA).

[See larger version]

B. lanceolatum (lanceolate-leaved). *fl.* rich scarlet, with the margin of the vexillum white, red at the disk, with a large yellow spot in the centre, each about 1in. long, disposed in axillary, sub-compound racemes. *l.* opposite, rarely alternate, ovate or ovate-lanceolate, entire, silky white beneath. *h.* 3ft. Swan River, 1848. (B. M. 4652.)

B. latifolium (broad-leaved).* *fl.* crimson-scarlet, large; vexillum oblong-ovate. April. *l.* ovate, flat, silky beneath. New Holland, 1803. A handsome climber. (B. R. 118.)

B. melanopetalum (black-petaled). Synonymous with *B. undulatum*.

B. undulatum (undulated).* *fl.* deep violet-maroon, solitary or twin; vexillum oblong, cordate, convolute, and bluntish above. March. *l.* oblong-ovate, mucronate, undulated. New South Wales, 1820. A tall subscandent plant. SYN. *B. melanopetalum*. (B. R. 642.)

BRACHYSPATHA (from *brachys*, short, and *spatha*, a spathe; the spathe is much shorter than the spadix). ORD. *Aroideæ*. Stove tuberous perennial, allied to, and requiring the same cultivation as, *Amorphophallus* (which *see*).

B. variabilis (variable).* *fl.* exhaling an abominable fœtor, which is, however, of very short duration; spathe much shorter than the spadix, greenish-purple, sharply acuminate, and many-nerved; spadix whitish, with female flower at the base, and above contiguous to them are the males without any intermediate neutral flowers; anthers orange red; the naked apex of the spadix is very long, wrinkled, and pitted on the surface. *l.* solitary, 18in. across; the spotted petiole divides at the top into three main divisions, each of which is again forked and deeply pinnately cut; the segments alternate, sessile, or decurrent, very unequal in size, ovate or oval-lanceolate, acuminate, glabrous, shining. *h.* 3ft. India, 1876. (G. C. 1876, 129.)

BRACHYSTELMA (from *brachys*, short, and *stelma*, a crown; in reference to the short coronal processes of the flowers). ORD. *Asclepiadaceæ*. Extremely curious little suffruticose, tuberous, twining, greenhouse perennials. Corolla campanulate, having angular sinuses; corona simple, five-cleft, lobes opposite the anthers, simple on the back. Leaves opposite, membranous. They thrive best in fibry loam. Propagated by cuttings, which will root in sandy soil, in heat; also by divisions of the root.

B. Arnotti (Arnott's). *fl.* brown, green. *l.* in opposite pairs, nearly sessile, crisped, ovate, dull green above, densely grey, pubescent beneath. *h.* 4in. South Africa, 1868. (Ref. B. i., 9.)

B. Barberæ (Mrs. Barber's). *fl.* dingy purple, speckled with yellow. August. *l.* large, linear-oblong, acute. *h.* 6in. South Africa, 1866. (B. M. 5607.)

B. ovata (ovate-leaved). *fl.* yellowish-green. *l.* ovate, shortly-stalked, pubescent. *h.* 1ft. South Africa, 1872. (Ref. B. 226.)

B. spathulatum (spathulate-leaved). *fl.* green. June. *l.* spathulate, oblong, hairy. *h.* 1ft. Cape of Good Hope, 1826. (B. R. 1113.)

B. tuborosum (tuberous). *fl.* purple. June. *l.* linear-lanceolate, ciliate. *h.* 1½ft. Cape of Good Hope, 1821. (B. M. 2343.)

BRACKEN, or **BRAKE FERN**. See **Pteris aquilina**.

BRACTEATE. Having bracts.

BRACTEOLATE. Having secondary bracts between the true bracts and the flowers.

BRACTS. Modified leaves placed near the calyx on the peduncle or pedicel.

BRAHEA (named after Tycho Brahe, the celebrated astronomer). ORD. *Palmeæ*. A small genus of dwarf palms, with fan-shaped leaves, and hermaphrodite, greenish flowers. They require rich light loam and fibrous peat, in equal parts, to which may be added a good portion of washed sand; thorough drainage and liberal supplies of water are also absolutely necessary. Propagated by seeds. During summer, they may be removed to the greenhouse, and can be employed with much success for sub-tropical gardening.

B. dulcis (sweet).* *l.* nearly circular, bright shining green; petioles clothed with woolly tomentum, armed at the edges with small close-set spines, and enveloped at the base in a network of brown fibre. Stem stout. Mexico, 1865. A rare and slow developing species.

B. filamentosa (filamentose). A synonym of *Washingtonia filifera*.

BRAINEA (commemorative of C. J. Braine, Esq., of Hong Kong, China). ORD. *Filices*. Sori continuous along transverse veins, near the midrib, and also produced along the veins in the direction of the edge of the frond.

B. insignis (remarkable), which is the only species, has a *trunk* 3in. to 4in. thick; scales linear, nearly 1in. long. *sti.* firm, 3in. to 4in. long, scaly only at the base. *fronds* 2ft to 3ft. long, 8in. to 12in. broad, simply pinnate; pinnæ close, numerous, linear, finely serrated. Hong Kong, 1856. A very handsome and interesting greenhouse tree fern, requiring a soil of loam and peat, in equal parts, with the addition of some sharp sand, and thorough drainage.

BRAMBLE. *See* **Rubus**.

BRASSAVOLA (named in honour of A. M. Brassavola, a Venetian botanist). ORD. *Orchideæ*. A genus of epiphytal orchids, requiring the heat of an intermediate house. Flowers large, usually with narrow acuminate greenish petals and sepals, and a white lip, which is sometimes broad; column having a pair of great falcate ears on each side of the front, and eight pollen masses. Leaves solitary, succulent. They are of easy culture on blocks of wood, with a little moss, suspended from the roof. Water should be plentifully given during the growing season; at other times, a very small quantity will suffice. About seventeen or eighteen species have been introduced, of which the following only are worth growing:

B. acaulis (stemless). *fl.* large; sepals and petals long, narrow, greenish and creamy-white; lip large, heart-shaped, and pure white; base of tube spotted with dull rose. September. *l.*

very narrow, rush-like. *h.* 4in. Central America, 1852. (P. F. G. ii., 152.)

B. Digbyana (Digby's).* *fl.* solitary, 4in. across, produced from the top of the bulb; sepals and petals creamy-white; lip same colour, streaked with purple down the centre, and beautifully fringed. Winter. *h.* 9in. Honduras, 1844. A compact-growing evergreen. (B. M. 4474.)

B. Gibbsiana (Gibbs's).* *fl.* white, spotted with chocolate, large, three on each spike. *l.* rather broad and very thick. This rare, erect-growing species must be potted in peat and sphagnum.

B. glauca (glaucous).* *fl.* solitary, produced from a sheath at the top of the bulb; sepals and petals yellow; lip orange, with a white throat. Early spring. *l.* of a milky-green. *h.* 1ft. Vera Cruz, 1837. A very handsome fragrant species, somewhat difficult to flower, but this obstacle may be overcome by liberally growing during the proper season, and giving it a severe dry rest. (B. M. 4033.)

B. lineata (lined).* *fl.* large, very fragrant; sepals and petals creamy-white; lip large, pure white. *l.* long, terete, channelled above, tapering to a point, very deep green. South America, 1850. (B. M. 4734.)

B. venosa (veined).* *fl.* small and compact; sepals and petals cream-coloured; lip white, strongly veined. A pretty free flowering species. Honduras, 1839. (B. R. 26, 39.)

BRASSIA (named after Mr. William Brass, who was sent by Sir Joseph Banks to Cape Coast and the neighbouring districts as a botanical collector, at the end of the last century). ORD. *Orchideæ*. A genus of tropical American orchids, very nearly allied to *Oncidium*, with which, indeed, Reichenbach unites it. From this genus, however, *Brassia* may be distinguished by its simple inflorescence, elongated tail-like sepals, and short column, which is quite destitute of the side lobes or ears that form a marked feature in the species of *Oncidium*. There are about seventeen species, of which many are not sufficiently attractive to deserve the cultivator's attention. They will succeed either in pots or in baskets, the drainage of which must be perfect. They require to be potted in good fibrous peat, broken in pieces not less in size than a walnut, placed in the warm end of a Cattleya or Brazilian house, and supplied liberally with water during summer. In winter, they must still be kept in a tolerably warm place, and given sufficient water to keep the pseudo-bulbs from shrivelling. It is useless to dry off until shrivelling takes place, for experience assures us that when a plant shrivels it is generally safe to assume that it has been tried beyond its powers of endurance, and that its constitution has given way. Propagated by dividing the plants, when growth has commenced.

B. antherotes (brilliant).* *fl.* 7in. in diameter from tip to tip of the sepals; sepals and petals yellow,

brownish-black at the base, narrow, ⅛in. broad, tapering; petals 1½in. long; lip triangular, yellow, barred with brown; spike strong, about 2ft. in length. Tropical America, 1879.

B. caudata (tailed).* *fl.*, sepals and petals yellow, barred with brown, from 4in. to 6in. long; lip broad and yellow, spotted with greenish-brown. When the plant is large and healthy, it produces numerous drooping spikes, 18in. long, and many-flowered. *h.* 1ft. West Indies, 1823 (B. R. 832.)

B. Gireoudiana (Gireoud's). *fl.*, sepals and petals bright yellow, spotted and blotched with deep red, produced in many-flowered scapes of singular and beautiful flowers during spring and early summer. This species much resembles *B. Lanceana*, but has larger flowers. Costa Rica. (R. X. O. 1, 32.)

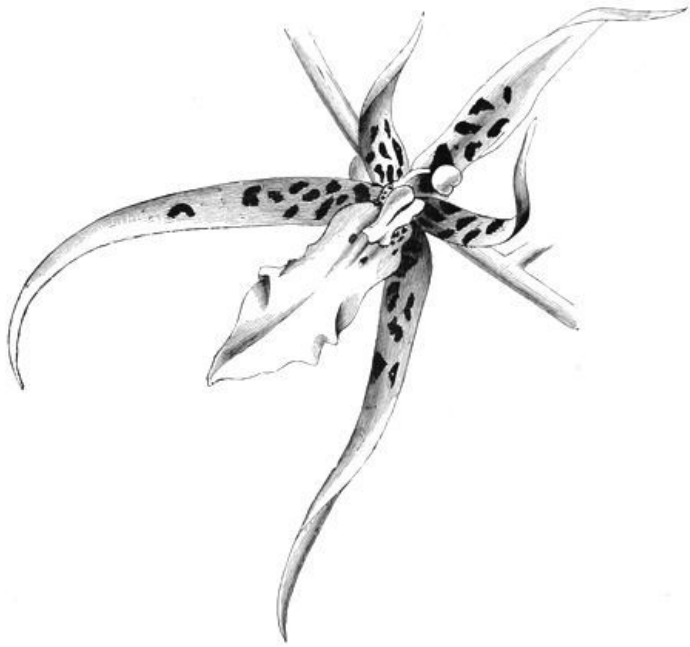


FIG. 275. SINGLE FLOWER OF BRASSIA LANCEANA.

B. Lanceana (Lance's).* *fl.*, sepals and petals lanceolate and tapering, bright yellow, blotched with brown, or sometimes with deep red; lip wholly yellow, slightly spotted at the base, and much waved, deliciously fragrant; scapes radical, many-flowered. In the typical species, the lip is rather more than half as long as the sepals. *l.* rich dark green. *h.* 9in. Surinam, 1843. See Fig. 275. (B. R. 1754.)

B. L. macrostachya (large-spiked).* *fl.*, sepals and petals bright rich yellow, sparingly spotted with brown, as in the type; sepals

lengthened out into tail-like appendages, which are sometimes nearly 5in. in length; lip wholly of a clear pale yellow. Demerara.

B. L. pumila (dwarf). *fl.*, sepals pale yellow, without spots or markings; petals of the same colour, tinged with purple near the base; lip about half the length of the sepals, slightly contracted in the middle, yellow, with a brownish-yellow base. Caracas.

B. Lawrenceana (Lawrence's).* *fl.* large, sweet-scented; sepals and petals bright yellow, spotted with cinnamon and green; lip yellow, tinged with green. June to August. *h.* 1ft. Brazil, 1839. (B. R. 27, 18.)

B. L. longissima (long-sepaled).* *fl.*, sepals deep orange-yellow, blotched and spotted, especially towards the base, with reddish-purple, and lengthened out into tail-like appendages, which, in well-grown examples, measure 7in. in length; petals about 2½in. long and ¼in. broad at the base, marked in the same manner as the sepals; lip about 3in. long, pale yellow, dotted and spotted towards the base with purple. August and September. Costa Rica, 1868. A magnificent variety.

B. maculata (spotted).* *fl.* large; sepals and petals pale yellow, irregularly spotted with brown; the

former being short compared with those of the other species; lip white, spotted about and below the centre with brown and purple. Spring and early summer. Jamaica, 1806. See Fig. 276. (B. M. 1691.)

B. m. guttata (spotted).* *fl.* on spikes 2ft. or 3ft. long; sepals and petals yellowish-green, blotched with brown; lip broad, yellow, spotted with brown. May to August. Guatemala, 1842. SYN. *B. Wrayæ*. (B. M. 4003.)

B. verrucosa (warty-lipped).* *fl.* large; sepals and petals greenish, blotched with blackish-purple; lip white, ornamented with numerous little green protuberances or warts, hence the specific name; scape many-flowered. May and June. Guatemala.

B. v. grandiflora (large-flowered).* *fl.* twice the size of, and a lighter colour than, the type. This variety is very rare, and is said to be the best of the genus.

B. Wrayæ (Wray's).* A synonym of *B. maculata guttata*.

BRASSICA (old Latin name used by Pliny; from *Bresic*, the Celtic name for Cabbage). Cabbage. ORD. *Cruciferæ*. Herbaceous, usually biennial, rarely annual or perennial, or suffrutescent plants, usually with a short caudex. Flowers yellow, rarely white, but never purple nor veined. Radical leaves usually

stalked, lyrate, or pinnatifid; cauline ones sessile or stem-clasping, entire; racemes elongated; pedicels bractless, filiform. Full cultural details will be found under the popular garden name of each variety.

B. oleracea (herb-like). *fl.* pale yellow, large. May and June. *l.* glaucous, waved, lobed, smooth. Root-stem cylindrical, fleshy. *h.* 1ft. to 3ft. England. Biennial.

B. o. acephala (headless). Borecole or Kale. Stem round, elongated. *l.* expanded, racemes panicled.

B. o. botrytis asparagoides (Asparagus-like). The Broccoli. *fl.* abortive. Stem taller than that of the Cauliflower. *l.* greyish-glaucous, elongated. Branchlets fleshy, bearing small flower-buds at the top.

B. o. b. cauliflora (Cauliflower). Heads of flower-buds thick, terminal. Stem short. *l.* oblong, of a greyish-glaucous colour.

B. o. bullata gemmifera (bud-bearing). Brussels Sprouts. Heads small, numerous, rising from the axils of the leaves along an elongated stem.

B. o. b. major (larger). Savoy Cabbage. Heads of leaves loose, thick, terminal, roundish. *l.* blistered.

B. o. capitata (headed). The Cabbage. Stem round, short. *l.*

concave, not blistered, crowded into a head before flowering; racemes panicled.

B. o. Caulo-rapa (Kohl-Rabi). Stem tumid and somewhat globose at the origin of the leaves.

B. Rapa (Rape). The Turnip. Radical leaves lyrate, destitute of glaucous bloom, green, covered with bristly hairs; middle cauline ones cut; upper ones quite entire, smooth.



FIG. 276. SINGLE FLOWER OF BRASSIA MACULATA.

BRASSICACEÆ. *See* **Cruciferæ**.

BRAVOA (named after Bravo, a Mexican botanist). ORD. *Amaryllidaceæ*. A pretty little graceful bulbous plant, hardy in very sheltered positions, but in exposed situations requiring a slight protection in winter. It is an admirable plant for cool-house culture, and delights in a compost of light rich loam, leaf mould, and sand. Propagated by offsets, which are obtainable in autumn; or by seeds, which should be sown as soon as ripe.

B. geminiflora (twin-flowered).* Twin Flower. *fl.* rich orange-red, tubular, drooping, disposed in the upper part of the flower-stems, which are sometimes 2ft. long. July. *l.* linear, ensiform, pale green. Mexico, 1841. (B. M. 4741.)

BRAZILIAN TEA. *See* **Ilex paraguariensis** and **Stachytarpheta jamaicensis**.

BRAZIL NUT. *See* **Bertholletia**.

BRAZIL WOOD. *See* **Cæsalpinia brasiliensis**.

BREAD FRUIT. *See* **Artocarpus**.

BREAD NUT. *See* **Brosimum**.

BREDIA (named in honour of Professor J. G. S. van Bred). ORD. *Melastomaceæ*. An ornamental greenhouse shrub, thriving in rich light loam, leaf soil, and peat. Propagated by cuttings of the ripened shoots, inserted in sandy loam, under a hand glass, in heat; or by seeds.

B. hirsuta (hairy).* *fl.* rose-pink, about ½in. across, disposed in loose, terminal, many-flowered cymes. Autumn. *l.* ovate acuminate, hairy.

Japan, 1870. (B. M. 6647.)

BREEZE. The small particles or refuse of gas coke. It constitutes a very cheap fuel, but, unless mixed with good coke, is only suitable for boilers of the saddle type, having a good draught. Breeze must not, however, be confounded with coke-dust.

BREVOORTIA COCCINEA. *See* **Brodiæa coccinea**.



Fig. 277. Flowering Branch of Brexia madagascariensis.

BREXIA (from *brexis*, rain; the large leaves afford protection against rain). Ord. *Saxifrageæ*. Excellent stove trees. Flowers green, in axillary umbels, surrounded by bracts on the outside. Leaves alternate, simple, dotless, and furnished with minute stipules. Stems nearly simple. They require a compost of two parts loam and one of peat, with the addition of a little sand, to keep the whole open. A liberal supply of water must be given at all seasons.

Cuttings, with their leaves not shortened, strike readily in sand under a hand glass, in heat; or a leaf taken off with a bud attached will grow. Leaves as in accompanying illustration (Fig. 277), and long, narrow, spiny-toothed ones, are often produced on the same plant. Probably the two species enumerated below are simply forms of one. Well hardened off, strong growing plants of *B. madagascariensis* are very suitable for sub-tropical gardening.

B. madagascariensis (Madagascar).* *l.* obovate or oblong, entire, while young minutely gland-toothed. *h.* 20ft. Madagascar, 1812. See Fig. 277.

B. spinosa (spiny). *l.* lanceolate, 20in. long, 2in. broad, spiny-toothed. *h.* 20ft. Madagascar, 1820.

BREXIACEÆ. A section of *Saxifrageæ*.

BRIAR. *See* **Rosa**.

BRICKS. In England, the standard thickness of brick walls is a Brick and a-half, that is, the length of one brick and the breadth of another. Thirty-two paving bricks, laid flat, will form one square yard of flooring; if set on edge, eighty-four will be required for the same space. The best Bricks for walls are those termed Stocks, which are well burnt. Grizzells and Place Bricks, being only partially burnt, are soft and not durable. In various parts of the kingdom, different clays and methods of manufacture cause a disparity in the weight and appearance of the finished article. Several forms are made to suit various purposes, but the standard size is 9in. long by 4½in. wide, by 2½in. thick, although, since the

remission of the duty, some slight variations occur, owing to shrinkage and other causes. Fire Bricks are made of a particular kind of clay, which will stand intense heat when once burnt, and are used in furnaces and other places where durability under great heat is a desideratum. Fire-clay should always be used in place of mortar in building with these.

BRILLANTAISIA (named after M. Brillant). ORD. *Acanthaceæ*. A very small genus of erect, branching, stove evergreen shrubs. Flowers large, in terminal panicles; corolla ringent; upper lip falcate and overarching, with a trifid apex, the lower one large, spreading, shortly trifid. Leaves ovate-cordate, on long petioles. For culture, *see* **Barleria**.

> **B. owariensis** (Owarian).* *fl.* violet-blue; cymes sub-sessile, loose; panicles terminal. March. *l.* large, opposite, petiolate. *h.* 3ft. Western Africa, 1853. This plant, in its habit of growth, resembles some of the largest species of *Salvia*. (B. M. 4717.)

BRISTLES. Stiff hairs.

BRISTLY. Covered with stiff hairs.

BRISTLY-TOOTHED. Furnished with teeth like bristles, or with the teeth ending each in a bristle.

BRIZA (from *briza*, to nod). Quaking Grass. ORD. *Gramineæ*. A genus of ornamental hardy grasses. Panicle loose; calyx two-valved; corolla two-valved, awnless; exterior one ventricose, interior small and flat. Fruit adnate with the corolla. These extremely graceful plants delight in a soil composed of loam, leaf soil, and peat. Seeds may be sown in spring or

autumn. For decorative purposes, the branches should be gathered as soon as full grown, and loosely placed in flower-stands, to dry. Tufts of these plants look extremely pretty on the rockery, or amongst hardy ferns.

B. gracilis (graceful). Synonymous with *B. minor*.

B. maxima (greatest).* *fl.*, spikelets oblong-cordate, thirteen to seventeen-flowered; panicle nodding at the end. June and July. *l.* long, linear-acuminate. *h.* 1½ft. South Europe, 1633. See Fig. 278.

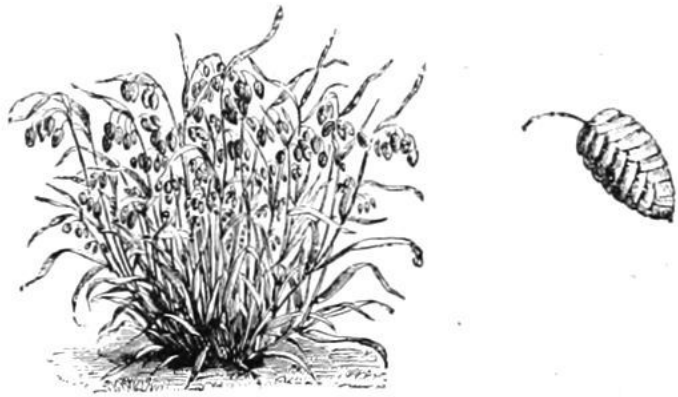


Fig. 278. Briza maxima, showing Habit and single Flower.

B. media (middle).* Common Quaking Grass. *fl.*, spikelets broadly ovate, of about seven florets (calyx shorter than the florets), tremulous with the slightest breeze, very smooth, shining purple. Branches of the panicle thread-shaped, divaricating, purple. June. *l.* short,

linear acuminate. *h.* 1ft. Britain. (S. E. B. 1774.)

B. minima (least). Synonymous with *B. minor*.



FIG. 279. BRIZA MINOR, showing Habit and small Panicle of Flowers.

B. minor (small).* Little Quaking Grass. *fl.*, spikelets triangular, seven-flowered; glumes longer than the flowers; panicle with hair-like branches. June and July. *l.* pale green, short, narrow. *h.* 8in. England (but very rare). An exceedingly pretty little annual or perennial grass. SYNS. *B. gracilis* and *B. minima*. See FIG. 279. (S. E. B. 1775.)

B. spicata (spiked). A recent introduction from Brazil, described as being very graceful and quite distinct, having erect spikes about 8in. in height.

BROADCAST. A method of sowing seeds by means of the hand, scattering them over the surface of the ground as equally as possible. It is now superseded, for the majority of garden and field crops, by drilling, which not only economises the quantity of seed used, but greatly facilitates subsequent weeding and thinning out.

BROCCOLI (*Brassica oleracea botrytis asparagoides*). A cultivated variety of the Cabbage, having the young inflorescence condensed into a fleshy, edible head (see Fig. 280). To grow this popular vegetable successfully, it is necessary to have rich soil of a good depth, in an open situation, where the plants can have plenty of sun and air to keep them sturdy. They succeed the autumn Cauliflower, and are in season from November till May.

Soil. In preparing ground for Broccoli, trench, in the autumn, to the depth of from 1½ft. to 2ft., and during the process work in a liberal dressing of rotten farmyard manure. Ground which has carried a crop of Celery is very suitable for the strong-growing kinds, as, by planting where the Celery rows have been, the necessity of trenching is, to a great extent, obviated. Smaller kinds, however, need to be planted closer in order to obtain a profitable crop.

Cultivation. At the beginning of May, prepare seed beds on a south border, and sow the earlier and sprouting kinds. The later varieties would, perhaps, be best sown in April, but they must not be put in early and allowed to remain too long in the seed bed. Sow thinly, to get the plants as sturdy as possible; and, to prevent clubbing, work in a little soot or wood ashes on the surface of the beds. Care must also be taken to pick off the club excrescences at planting time, should there be any, and to destroy

the grub inside. Clubbing is not so frequent in ground which has been well trenched, and where the plants are not allowed to suffer from drought. Showery weather should be selected for transferring them to their permanent quarters. If it is desired that they should succeed potatoes, they may be planted between every two alternate rows, and the latter crop can be removed when ready. Broccoli succeed best where the ground is firm, and not recently dug or manured. Planting with a crowbar is preferable to digging the ground afresh. If grown by themselves, a distance of from 2ft. to 3ft. should be allowed between the rows, and an equal distance from plant to plant. Some of the early varieties will, in favourable seasons, follow the later Cauliflowers, while the latest will not be fit for use until the following spring. The heads should be cut as soon as they are large enough; they will keep good for a week in a cold place, while a day or two might open them too much if allowed to remain on the plants. Broccoli which have to stand the winter are liable to injury from severe frosts, and some method of protection is necessary. Two plans are recommended for both large and small gardens, and either or both may be adopted, as found convenient. The first is to apply a covering of fern or other dry protective material, not using too much, but giving sufficient to break the rays of the sun, which, perhaps, do as much harm as the actual frost. The other plan is to take up the plants as soon as the flowers can be seen, and lay them in under a hedge or wall until required for use. In sheltered positions, or where there are trees to break the force of the wind, the covering with dry litter during severe weather will generally be found sufficient; still, a little precaution in lifting will frequently save a valuable crop. Broccoli should

never follow a crop of any other kind of cruciferous plants, particularly Cabbage.



FIG. 280. BROCCOLI.

Sorts. Veitch's Self-protecting Autumn, Purple and White Cape, Grange's Early White, and Snow's Winter White. These are the best for autumn and mid-winter supplies. A good selection for spring and late purposes is Mitchinson's Penzance, Knight's Protecting, Cooling's Matchless, Purple Sprouting, Model, Willcove, Leamington, and Cattell's Eclipse.

BRODIÆA (named after J. J. Brodie, a Scotch cryptogamist). SYN. *Hookera*. ORD. *Liliaceæ*. Pretty, slender, hardy, or in some positions only half-hardy,

bulbs. The flowers are usually borne in large clusters or umbels; the prevailing colour is blue; *coccinea* is, however, an exception, the flowers being scarlet. The scape is usually straight and slender, but strong. Leaves from two to four in number, enveloping the part of the scape beneath the surface, and procumbent thereon. Most of them are of easy culture in rich sandy loam; if grown in pots, a mixture of loam, leaf soil, and sand, suits them well. Increased freely by offsets, which should be left undisturbed with the parent bulbs till they reach a flowering state, when they may be divided and replanted in autumn.

B. capitata (headed).* *fl.* deep violet-blue, funnel-shaped, disposed in a compact, many-flowered umbel; valves of the spathe also deep violet. May. *l.* narrow, linear. *h.* 1ft. to 2ft. California, 1871.



Fig. 281. Brodiæa coccinea, showing Flower and Habit.

B. coccinea (scarlet).* *fl.* 1½in. long, tubular, rich blood-red below, the apex of the tube and the segments yellowish-green; umbels composed of five to fifteen drooping flowers. June. *l.* linear, loose, shorter than the scape. *h.* 1½ft. California, 1870. Very handsome, distinct from all other species, requiring a warm, well-drained, and sunny position, and to remain undisturbed. Syn.

Brevoortia coccinea. See Fig. 281. (B. M. 5857.)

B. congesta (close-headed).* *fl.* blue, with the crown paler; segments cleft at the top; umbel bearing six to eight blooms. The stamens in this species are metamorphosed into fleshy scales, which adhere to the mouth of the perianth. Summer. *l.* few, long, slender, channelled on the inside. Bulb small, roundish, and much wrinkled. *h.* 1ft. Georgia, &c., 1806. A very free-growing and rapidly increasing species.

B. c. alba (white).* *fl.* white; in other respects like the type, but not so vigorous.

B. gracilis (graceful).* *fl.* deep yellow, with brown nerves, ½in. or rather more long, in few-flowered umbels. July. *l.* solitary, about ¼in. broad, longer than the scape. *h.* 3in. to 4in. California, 1876. A scarce and rather tender little species, but very pretty.

B. grandiflora (large-flowered).* *fl.* bluish-purple, with entire pointed segments; umbels bearing two to seven somewhat scattered blooms. Summer. *l.* two to three or more, linear, pointed, slender, grooved on the inside, furnished with a few membranous scales. Bulb small, roundish, dry and wrinkled. *h.* 1½ft. North America, 1806. SYN. *Hookera*

coronaria. (B. R. 1183.)

B. Howellii (Howell's).* *fl.* purplish-blue, about ¾in. across, sub-bell-shaped, in many-flowered umbels. July and August. *l.* narrow acute, grooved, shorter than the scape. *h.* 18in. to 24in. California, 1880.

B. ixioides (Ixia-like). *See* **Calliprora lutea**.

B. lactea (milky-white).* *fl.* white, usually with green midribs, ½in. to ¾in. across, saucer-shaped, in many-flowered umbels. June and July. *l.* linear, acute, nearly as long as the scape. *h.* 1ft. to 2ft. California, 1833. SYNS. *Hesperoscordum lacteum*, *Milla hyacinthina*.

B. multiflora (many-flowered).* *fl.* blue-purple, very numerous, in sub-globose heads. May. *l.* linear, elongate, 1ft. to 2ft. long, rather fleshy. *h.* 1ft. to 1½ft. California, 1872. (B. M. 5989.)

B. volubilis (twining). *fl.* rose-coloured, in dense umbels, each containing fifteen to thirty blooms; scape twining, sometimes 12ft. long. July. *l.* narrow, linear-lanceolate, 1ft. long, synanthous. California, 1874. Half-hardy bulb. (B. M. 6123.)

BROMELIA (named after Bromel, a Swedish botanist). ORD. *Bromeliaceæ*. A genus of stove herbaceous perennials, allied to the Pineapple.

Flowers, corolla three-petaled, convolute, erect, or spreading at the top. Leaves densely packed, rigid, lanceolate, with spiny margins. Stems short. These plants require much the same treatment as *Billbergia*. Allied genera are *Æchmea*, *Ananassa*, *Billbergia*, *Disteganthus*, *Greigia*, *Karatas*, *Ruckia* (which *see*).

B. antiacantha (opposite-spined). *fl.* purple, scarlet. Brazil, 1864. SYN. *B. sceptrum*.

B. bicolor (two-coloured).* *fl.* scarlet, in a close central sessile head. March. *l.* numerous, narrow, ensiform, outer green, central crimson; elegantly radiate. Chili, 1872. SYNS. *B. Joinvillei*, *B. pitcairniæfolia*. (B. H. 14.)

B. bracteata (red-bracted).* *fl.* pink; scape elongated; raceme compound; bracts red, ovate-lanceolate. September. *l.* serrate, spiny. *h.* 2ft. Jamaica, 1785.

B. Fernandæ (Fernanda's).* *fl.* yellowish, in ovoid heads; bracts orange-red. July. *l.* linear-ligulate, 24in. to 30in. long, recurved, spiny-edged. Para, 1872.

B. Joinvillei (Joinville's). A synonym of *B. bicolor*.

B. Karatas. *See* **Karatas Plumieri**.

B. pitcairniæfolia (Pitcairnia-leaved). A synonym of *B. bicolor*.

B. sceptrum (sceptre-like). A

synonym of *B. antiacantha* and *Karatas Plumieri*.

BROMELIACEÆ. An extensive order of stemless or short-stemmed plants, having rigid, channelled, and usually spiny leaves. Flowers very showy; outer perianth three-cleft, persistent, inner one of three withering segments; stamens six, inserted in the tube of the perianth. To this order belongs the Pineapple. The genera best known in gardens are *Ananassa*, *Æchmea*, *Billbergia*, *Bromelia*, and *Tillandsia*.

BROMHEADIA (in honour of Sir Edward Finch Bromhead). ORD. *Orchideæ*. A small genus of stove orchids, comprising a couple of species, with erect stems, large flowers, and cucullate lip, which is parallel with the column. For culture, *see* **Ansellia**.

B. palustris (marsh).* *fl.*, sepals and calyx white; lip white externally, within streaked with purple, and having a yellow blotch in centre; spike terminal, distichous, flexuous, many-flowered, on a long peduncle; bracts short, stiff, tooth-like. June. *l.* distichous, oblong-linear, emarginate. *h.* 2ft. Singapore, 1840. (B. R. 30, 18.)



FIG. 282. BROMUS BRIZÆFORMIS.

BROMUS (from *bromos*, the Greek name for a wild oat). *Ord. Gramineæ*. *B. brizæformis* (see Fig. 282) is an elegant biennial grass, with drooping panicles of spikelets, about as large as those of *Briza maxima*. It grows about 2ft. high, and is of very easy culture in common garden soil. Sow seeds outside in patches, in July, thinning out the plants when necessary. There are numerous other species belonging to this genus, but the above-mentioned is the only one worth growing in gardens. It forms a beautiful object in the mixed border, or among ferns.

BRONGNIARTIA (in honour of Adolphe Brongniart, a distinguished botanist, and one of the editors of "Annales des Sciences Naturelles"). ORD. *Leguminosæ*. Handsome greenhouse evergreen sub-shrubs, clothed with silky villi. Flowers large, purple; pedicels twin, axillary, one-flowered. Leaves impari-pinnate, with many pairs of leaflets, the terminal one not remote from the rest. They require a compost of sandy loam, leaf soil, and fibry peat, with perfect drainage. Cuttings of the young shoots, if firm at the base, will

root if dibbled in sand, under a bell glass, in a cool house.

B. podalyrioides (Podalyria-like).* *fl.* purple, large. September. *l.* with two to five pairs of leaflets; leaflets elliptic-oblong, rounded, and mucronate at the apex, clothed with adpressed hairs on both surfaces, but silky when young. *h.* 1ft. New Spain, 1827.

B. sericea (silky).* *fl.* purple. September. *h.* 1ft. *l.*, leaflets ovate-oblong, acute, very silky on both surfaces. Mexico, 1843.

BROOK-LIME. *See* **Veronica Beccabunga**.

BROOM. *See* **Besom.**

BROOM. *See* **Cytisus scoparius**.

BROOM RAPE. *See* **Orobanche**.

BROOM, SPANISH. *See* **Spartium junceum**.

BROSIMUM (from *brosimos*, edible; fruit edible). Bread Nut. ORD. *Urticaceæ*. A genus of stove evergreen shrubs or trees, principally of economic value in their native countries. Male and female flowers generally in a globular head, but sometimes borne on separate trees; calyx and corolla wanting. Leaves entire. They generally thrive in a rich fibry loam. Cuttings of ripe wood, with their leaves on, root if placed in sand, in moist heat.

B. Alicastrum. *fl.*, catkins globose, stalked, twin, axillary. *fr.* coated. *l.* ovate-lanceolate. *h.* 6ft. Jamaica,

1776.

BROUGHTONIA (named after Mr. Arthur Broughton, an English botanist). ORD. *Orchideæ*. A very compact-growing stove evergreen, allied to *Lælia*, succeeding best if suspended from the roof on a block of wood, with a little moss; it requires a free supply of heat and water when in a growing state. Propagated by dividing the plant. The colour of the flowers is very distinct.

B. sanguinea (blood-coloured).* *fl.* blood-coloured, rather large, disposed in a terminal panicle; scape divided; column distinct, or at the very base united with the unguiculate lip, which is lengthened at the base into a tube, connate with the ovarium. Summer. *l.* twin, oblong, seated on a pseudo-bulb. *h.* 1½ft. Jamaica, 1793. (B. M. 3076.)

BROUSSONETIA (named after P. N. V. Broussonet, a French naturalist, who wrote numerous works on Natural History). ORD. *Urticaceæ*. Ornamental fast-growing, deciduous, Mulberry-like trees. They require rather good open garden soil, and prove hardy in situations which are not very exposed. Propagated by suckers and cuttings of ripened wood, inserted in autumn, in a cool house; and by seeds, sown when ripe, or kept till the following April.

B. papyrifera (paper-bearing).* The Paper Mulberry. *fl.* greenish, diœcious; males in pendulous, cylindrical catkins, each flower in the axil of a bract; females in

peduncled, axillary, upright globular heads. May. *l.* simple, alternate, exstipulate, variously lobed or entire, hairy, large. *h.* 10ft. to 20ft. China, 1751. There are several varieties, differing in the shape and character of the leaves. (B. M. 2358).

BROWALLIA (named in honour of John Browall, Bishop of Abo, who defended the sexual system of Linnæus against Siegesbeck, in a book entitled "Examen epicriseos," &c., 1739). ORD. *Scrophularineæ*. A genus of handsome shrubs or herbs. Flowers blue or white, axillary and terminal; corolla salver-shaped, resupinate from the contortion of the peduncle; tube fifteen-nerved, ventricose at top. Leaves alternate, stalked, ovate in outline. They thrive best in a rich, open, sandy soil. To have strong plants in bloom by Christmas and after, seeds should be sown in July, in pans or pots of light rich sandy soil, and kept in a close frame, or hand light, where they can be shaded till germination takes place. When large enough to handle, the seedlings may either be pricked out, three in a pot, or potted singly, according to the size of the specimens required. In the former way, they form fine masses for conservatory or greenhouse decoration, or to cut from; and in the latter, they are very suitable for window recesses, &c. After potting, they should be stood in a pit or frame, and syringed every morning and evening, to ward off attacks of insect pests. An abundance of well-diluted liquid manure is required as soon as the flower-buds appear. To keep the plants dwarf and bushy, it will be needful to stop them about three times during the remainder of the summer and autumn, keeping as near the glass as

possible; they should be housed by the end of September. These elegant little greenhouse annuals are unrivalled for affording choice, neat sprays for bouquets during the winter and early spring months, or for growing as pot plants, to furnish warm greenhouses or sitting-room windows. Many of the species and varieties are largely employed for summer decoration of the flower garden, with highly satisfactory results; for this purpose, seeds should be sown in gentle heat early in spring, and the plants transferred to the flower borders late in June, or early in July, having been previously encouraged in pots, and well hardened off.

B. abbreviata (shortened). *fl.* light red; pedicels shorter than the calyx; calyx campanulate, with teeth as long as the tube. *l.* oval, hairy when young, quite glabrous when mature. 1852. (R. G. 94.)

B. demissa (low).* *fl.* of a bright but pale blue colour, sometimes red or purple; peduncles axillary, one-flowered, downy. June. *l.* ovate-oblong, acuminated, oblique at the base. *h.* 6in. to 1ft. Panama, 1735. (B. M. 1136.)



Fig. 283. Browallia elata, showing Habit and Flower.

B. elata (tall).* *fl.* deep blue; calyx beset with glandular hairs; peduncles axillary, one or many-flowered. July. *l.* oval, acuminated. *h.* 1½ft. Peru, 1768. Of this extensively-grown species there are two varieties, one with white flowers, and the other, *grandiflora*, with pale blue, both of which are well worth growing. See Fig. 283. (B. M. 34.)

B. grandiflora (large-flowered).* *fl.*, corolla with a greenish-yellow tube, which is clothed with glandular villi, and a white or very pale lilac limb; peduncles one-flowered, axillary, racemose at the tops of the branches. July. *l.* ovate, acute, attenuated into the petioles at the base. *h.* 1ft. to 3ft.

Peru, 1829. (B. M. 3069.)

B. Jamesoni (Jameson's).* *fl.* bright orange, with lighter-coloured throat, tubular. June. *h.* 4ft. New Grenada, 1850. This species has been recently re-introduced, after having been lost to cultivation for over thirty years. (B. M. 4605.)

B. Roezli (Roezl's). *fl.* large, either of a delicate azure blue, or white, with a yellow tube. Spring to autumn. *l.* shining green. An exceedingly pretty species, having flowers double the size of any other, and forming a dense compact bush, 1½ft. to 2ft. in height. Rocky Mountains.

BROWNEA (named after Patrick Browne, M.D., author of a History of Jamaica). ORD. *Leguminosæ*. Very handsome stove evergreen trees or shrubs, allied to *Amherstia*. Flowers of a rose-scarlet colour, rising in fascicled heads from the axillary buds. Leaves abruptly-pinnate, when young flaccid, and with the leaflets revolute at the edges; leaf-bud long and stipulaceous. All the species are well worthy of the most extensive cultivation. A mixture of loam, peat, and sand, is a soil well adapted for them, and great care should be taken not to over-water the plants in winter, as too great a supply will be sure to kill them. Propagated by cuttings, taken from ripened wood, planted in a pot of sand, and placed under a hand glass, in a moist heat.

B. Ariza (Ariza).* *fl.* richest scarlet,

produced in a large, globular, drooping head of immense size. Summer. *l.* pinnate, usually with six or eight pairs of pinnæ, which are oblong-lanceolate, and sharply tapered to a point. *h.* 20ft. to 40ft. Columbia, 1843. This noble tree requires a large house to fully perfect its beauty. SYN. *B. princeps*. (B. M. 6459.)

B. Birschellii (Birschell's). *fl.* rose-coloured, in drooping racemes. April to July. *l.* pinnate; leaflets oblanceolate, 6in. long. *h.* 10ft. to 20ft. La Guayra, 1872. (B. M. 5998.)

B. coccinea (scarlet).* *fl.* scarlet, fascicled. July to August. *l.* with two to three pairs of oval-oblong, acuminated leaflets. *h.* 6ft. to 10ft. Venezuela, 1793. (B. M. 3964.)

B. grandiceps (large-headed).* *fl.* red, in dense capitate spikes. July. *l.* with usually twelve pairs of oblong-lanceolate glandless leaflets, ending in a long cuspidate acumen; branches and petioles pubescent. *h.* (in its native home) 60ft. Caraccas, 1829. (B. M. 4859.)

B. latifolia (broad-leaved). *fl.* red, in dense fascicles; involucre tomentose. *l.* with one to three pairs of ovate or obovate-cuspidate leaflets. *h.* 6ft. to 8ft. Caraccas, 1824.

B. macrophylla (large-leaved).* *fl.*

orange-scarlet, in dense heads, often measuring nearly 3ft. in circumference. Central America, 1879. (G. C. 1873, p. 779.)

B. princeps (chief). A synonym of *B. Ariza*.

B. racemosa (clustered).* *fl.* rose-coloured, racemose; involucre and calyx clothed with fine tomentum. *l.* with four pairs of unequal-sided, oblong, or oblong-lanceolate, cuspidately-acuminated leaflets, which are glanduliferous at the base. *h.* 4ft. Caraccas, 1826.

B. Rosa del Monte. *fl.* scarlet, in dense heads; leaflets of the involucre roundish, imbricated, and, when in a young state, rather velvety. June. *l.* with two to three pairs of oval-oblong acuminated leaflets; branches and petioles glabrous. *h.* 8ft. South America, 1820. (B. R. 1472.)

BROWNLOWIA (named in honour of Lady Brownlow, daughter of Sir Abraham Hume, and a great patroness of botany). ORD. *Tiliaceæ*. Very handsome greenhouse evergreen trees, thriving well in a mixture of loam and peat. Cuttings of ripe shoots will root if placed in sand, under a hand glass, in heat.

B. elata (tall).* *fl.* yellow; panicle terminal, conical, spreading. May. *l.* large, cordate, acute, seven-nerved, smooth. *h.* 60ft. India, 1823. (B. R.

1472.)

BRUCEA (commemorative of James Bruce, the celebrated African traveller). ORD. *Simarubeæ*. Ornamental stove evergreen shrubs. Flowers small, purplish inside, disposed in interrupted glomerate spikes, or racemes. Leaves impari-pinnate, with six pairs of opposite, entire or serrated leaflets, without dots. Branches, peduncles, petioles, and nerves of leaves, clothed with rufescent down. They thrive in a loamy soil; and cuttings from ripened wood strike freely, in a pot of sand, under a hand glass, in a moderate heat.

B. antidysenterica (antidysenteric). *fl.*, racemes simple, spike-like. May. *l.*, leaflets quite entire, clothed with rusty villi on the nerves beneath. *h.* 8ft. Abyssinia, 1775.

B. sumatrana (Sumatra).* *fl.* dark purple; racemes usually compound. May. *l.*, leaflets serrated, villous beneath. *h.* 20ft. Sumatra, 1822.

BRUCHUS GRANARIUS. *See* **Bean Beetle.**

BRUCHUS PISI. *See* **Pea Weevil**.

BRUGMANSIA. *See* **Datura**.

BRUNFELSIA (named after Otto Brunfels, of Mentz, first a Carthusian monk, and afterwards a physician; he published the first good figures of plants in 1530). SYN. *Franciscea*. ORD. *Scrophularineæ*. Elegant free-flowering stove evergreens. Flowers sweet-scented; corolla large, funnel or salver-shaped, with a long tube, and a flat, five-lobed, obtuse, nearly equal limb. A light rich soil, or a compost of loam, leaf soil,

and peat, is necessary to grow these plants successfully. Propagated by cuttings, planted in sand, and placed under bell glasses, in a moderate heat. When rooted, they should be placed in small pots, in a compost somewhat more sandy than that already mentioned. While growing, they require to be kept in a moist stove temperature, and should be hardened by placing them in a drier, and somewhat cooler, temperature after each growth is completed; the pots should be changed as often as the roots become thick around the ball of earth. The larger plants flower freely, and should be slightly pruned in annually, before commencing their new growth, thus securing neat and compact specimens. Repotting should be effected directly they have done flowering. The plants should then be placed in a temperature ranging from 60deg. to 68deg., and both the roots and foliage liberally supplied with water. When flowers appear—about October or November—the syringing must be less frequently performed. At this period, if it be desirable to prolong the flowering season, the plants should be removed to a temperature of about 48deg. A few administrations of weak liquid manure during the growing season are of great value.

B. acuminata (taper-pointed-leaved).* *fl.* bluish-violet, few, sub-cymose, terminal. April. *l.* oblong, acuminated, attenuated a little at the base, glabrous; bracts lanceolate, acuminated, glabrous. *h.* 1ft. to 2ft. Rio Janeiro, 1840. (B. M. 4189.)

B. americana (American).* *fl.* first yellow, then white, very sweet-scented; axillary flowers solitary,

terminal ones numerous. June. *l.* obovate, elliptic, acuminated, longer than the petioles. *h.* 4ft. to 6ft. West Indies, 1735. There are narrow and broad-leaved varieties of this species. (B. M. 393.)



Fig. 284. Flower of Brunia nodiflora.

B. calycina (cup-shaped).* *fl.*

purple, disposed in large trusses, which are produced in succession throughout the whole year. *l.* large, lanceolate, shining light green. *h.* 2ft. Brazil, 1850. One of the largest-flowered species grown. (B. M. 4583.)

B. confertiflora (dense-flowered). *fl.* soft blue, cymosely crowded, terminal. January to June. *l.* nearly sessile, oblong-acute, attenuated at the base, rather pilose, ciliated, yellowish-green above; bracteoles oblong, attenuated at the base, and are, as well as the calyces, clothed with rusty hairs. *h.* 1ft. to 2ft. Brazil.

B. eximia (choice).* *fl.* produced from the points of the shoots, upwards of 2in. in diameter, deep purple. January to July. *l.* oblong-lanceolate, dark green, but not glossy. *h.* 2½ft. Brazil, 1847. (B. M. 4790.)

B. grandiflora (large-flowered). *fl.* greenish; limb of corolla 2in. in diameter, corymbose, terminal. June. *l.* elliptic-oblong, acuminated. Branches twiggy. *h.* 3ft. Peru.

B. hydrangeæformis (Hydrangea-like).* *fl.* beautiful bluish-violet; cymes terminal, hemispherical, large. April. *l.* oblong, acute, cuneiform at base, quite glabrous, 1ft. long; bracts lanceolate, aggregate. *h.* 1ft. to 3ft. Brazil, 1840.

This is one of the most elegant species of the genus. (B. M. 4209.)

B. latifolia (broad-leaved). *fl.* at first lavender-colour, with a distinct white eye, eventually becoming almost white; deliciously fragrant, sub-cymose, terminal. Winter to early spring. *l.* broad-elliptic, acutish, greyish-white, 6in. to 7in. long, and 2in. to 2¾in. broad. *h.* 2ft. to 3ft. Brazil, 1840. (B. M. 3907.)

B. Lindeniana (Linden's).* *fl.* rich purple, with a light eye. *l.* ovate-acuminate, dark green. Brazil, 1865. (B. H. 1865, 226.)

B. uniflora (one-flowered). *fl.* solitary; corolla with a whitish tube, and a bluish-violet or purple limb. Winter. *l.* elliptic, acute; branches greenish, hoary, diffuse, spreading. *h.* 1ft. to 3ft. Brazil, 1826. (L. B. C. 1332.)

BRUNIA (named after Corneille de Bruin, better known under the name of Le Brun, a Dutchman, a traveller in the Levant). ORD. *Bruniaceæ*. Elegant little greenhouse evergreen Heath-like shrubs, more or less branched, with the branches in whorls, erect or spreading. Flowers capitate, furnished with three bracts each, or sometimes deficient of the two lateral ones. Leaves small, closely imbricate. They require a compost of peat and sand, with a little leaf soil added, firm potting and good drainage. Cuttings of young shoots root freely in sand, under a hand light, in summer.

B. nodiflora (knot-flowered).* *fl.* white; heads globose, size of a cherry, on the tops of the branches. July. *l.* lanceolate, awl-shaped, trigonal, acute, smooth, closely imbricate, not ustulate at the apex. *h.* 1ft. to 3ft. Cape of Good Hope, 1786. See Fig. 284.

BRUNIACEÆ. An order of much-branched Heath-like shrubs, usually having small leaves, which are crowded and entire. Flowers in terminal heads; petals five, alternating with the lobes of the calyx. The typical genus is *Brunia*.

BRUNONIA (named after Robert Brown, the most eminent botanist of his time). ORD. *Goodenoviæ*. A stemless greenhouse perennial herb, with the habit of *Scabiosa*, downy from glandless simple hairs. Flowers distinct, with a whorl of five membranous bracts; corolla blue, marcescent. Radical leaves quite entire, spathulate; scapes undivided, each bearing one head; head hemispherical, lobate; lobes involucrated by foliaceous bracts. It thrives in a compost of decayed manure, or leaf soil and peat, with a little loam added; thorough drainage is necessary. Propagated by divisions, in early spring, previous to repotting.

B. australis (southern)* is the only species known to be in cultivation. *h.* 1ft. New Holland, 1834. (B. R. 1833.)

BRUNSVIGIA (named after the noble House of Brunswick). ORD. *Amaryllideæ*. Very showy greenhouse bulbous plants, from the Cape of Good Hope. Flowers red, on very long pedicels. Bulbs

large. Leaves broad, horizontal; perianth with an evident longer or shorter tube, curving upwards, funnel-shaped, deeply six-parted, deciduous; segments sub-equal, many-nerved, flat, and recurved at the apex; stamens on the tube much curved upwards; scape appearing in summer without the leaves; umbels many-flowered. Propagation is effected by offsets, of which the large bulbs produce but few. These, when secured, may be removed after reaching some considerable size, carefully potted in a mixture of sandy loam and peat, with good drainage, and kept tolerably warm and close until established; water must be given but sparingly until root-action has commenced. The best place for growing the offsets into a flowering size is on a shelf near the glass, in a temperature of from 50deg. to 55deg. With an abundance of water while growing, and kept dry while semi-dormant, thus allowing them a rest, the bulbs will speedily increase in size; but it may be years before flowers are produced. Culture: This may be divided into two periods—one of growth, and one of rest. After the latter period, they should be allowed to start into fresh growth, without stimulation, and, as soon as started, liberal supplies of water should be given, and a genial temperature of from 60deg. to 65deg. maintained, to make them grow vigorously. Good-sized pots are also necessary, with a mixture of loam, peat, and sand, in equal parts. They are usually confined to the greenhouse, or warm conservatory, but are sometimes successfully grown in a south border at the base of a wall, planted out in a pit, upon which the lights may be placed in winter, and matted if necessary, as they cannot endure frost. A good depth of soil, consisting of fibrous loam, peat, and sand, in equal proportions, with good drainage, should be prepared. In all cases,

the bulbs should be planted somewhat deeply. One of the most satisfactory methods of ensuring the flowering of these plants consists in subjecting the bulbs, when at rest, to a hot dry heat of 70deg. or more, which thoroughly ripens them; but, after this treatment, it will be necessary to encourage the after-growth to the fullest possible extent.

B. ciliaris (hair-fringed). *fl.* dull purple. *l.* strongly fringed with white hairs. *h.* 1ft. 1752. (B. R. 1153.)

B. Cooperi (Cooper's).* *fl.* sulphur-coloured, edged with red; umbels twelve to sixteen-flowered. *l.* ligulate-obtuse, bifarious, fleshy. *h.* 1½ft. 1872. (Ref. B. 330.)

B. falcata (sickle-leaved).* *fl.* red. May. *l.* sickle-shaped, with a muricated, discoloured, cartilaginous edge. *h.* 9in. 1774. (B. M. 1443.) SYN. *Ammocharis falcata*.

B. Josephineæ (Josephine's).* *fl.* scarlet; scape twice as long as the rays of the many-flowered umbel. *l.* strap-shaped, erect, spreading, glaucous. *h.* 1½ft. This handsome species is much grown. 1814. (B. M. 2578.) *Minor* and *striata* are varieties.

B. multiflora (many-flowered).* *fl.* red, loosely umbellate. June. *l.* linguiform, smooth, lying on the ground. *h.* 1ft. 1752. (B. M. 1619.)

B. toxicaria (poison-bulb).* *fl.* pink;

umbel hemispherical, many-flowered. September to October. *l.* many, erect, oblique, glaucous. *h.* 1ft. 1774. (B. R. 567.) *B. coranica* is a variety of this. 1815. (B. R. 139.)

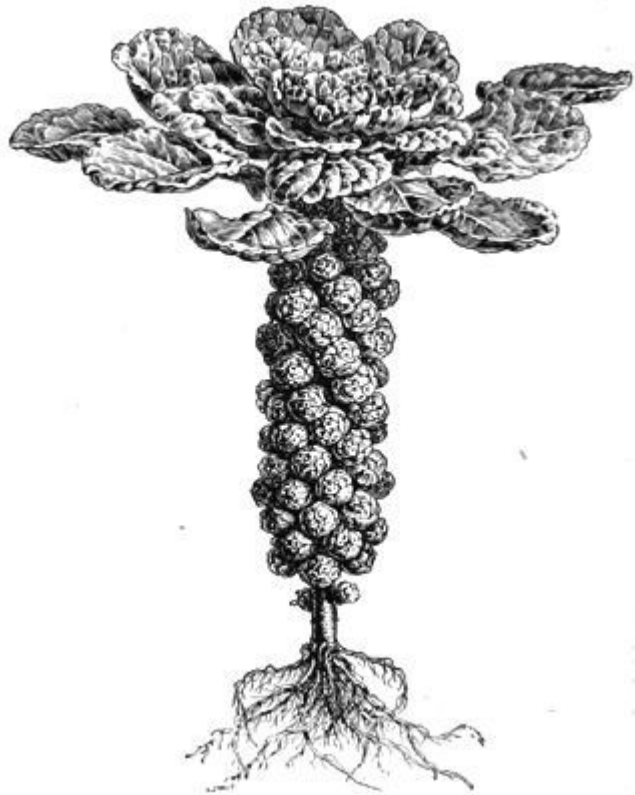


Fig. 285. Brussels Sprouts.

BRUSSELS SPROUTS (*Brassica oleracea bullata gemmifera*). A cultivated variety of the Cabbage (Fig. 285). Leaves blistered. Stems covered with small, close heads. To secure this vegetable in its best form, it must be grown on deeply-worked and rich ground. In addition, the seeds should be obtained from a

good source, as there are many spurious stocks in cultivation. Plenty of room must be allowed the plants to develop, and the tops and leaves should not be removed till after the sprouts are gathered; dead leaves, of course, excepted. It is a bad plan to plant Brussels Sprouts amongst potatoes or other crops, as they become unduly weakened, and never give such good returns as when grown by themselves.

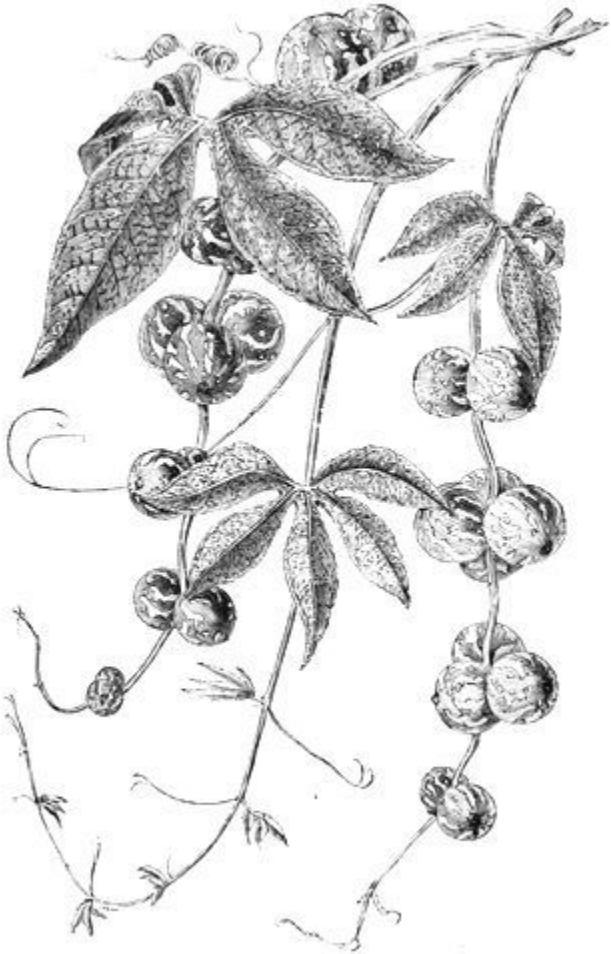


Fig. 286. Bryonia laciniosa.

Soil and Cultivation. In February, and early in March, sow thinly in a cold frame, or carefully prepare seed beds on a warm south border. As soon as the plants are large enough, prick them off into prepared soil, to grow on; about the end of April, transplant into a piece of rich ground, which has been previously prepared for them, setting in rows from 2ft. to 3ft. asunder, and 2ft. apart in the rows. The earlier the plants are put out, the better; and they should be watered-in when planted, so that they receive as little a check as possible. They must be kept clear of weeds, and earthed up as soon an they get a good size. During severe frost, some light dry litter may with advantage be thrown over them for protection; and the less they are interfered with when frozen, the better.

Sorts. The Imported is the best strain for general use; other good sorts are: Sutton's Matchless, The Aigburth, and Scrymger's Giant.

BRYA (from *bryo*, to sprout; the seeds germinate before falling from the tree). ORD. *Leguminosæ*. A small genus of stove shrubs or small trees, furnished with stipular spines, and solitary, or clustered, or pinnate leaves. The undermentioned species thrives in a rich fibry loam. Propagated by seeds, or by cuttings, placed in a hotbed.

B. Ebenus (ebony). Jamaica Ebony. *fl.* bright yellow; peduncles two to three together, axillary, one to two-flowered, shorter than the leaves. July and August. *l.*, leaflets aggregate, obovate. *h.* 12ft. to 14ft. West Indies, 1713. (B. M. 4670.)

BRYANTHUS (from *bryon*, a moss, and *anthos*, a

flower). ORD. *Ericaceæ*. A genus of small trailing shrubs, allied to *Loiseleuria*. Flowers terminal, somewhat racemose; calyx five-leaved, imbricate; corolla deeply five-parted, spreading. Leaves crowded, spreading, flattish. For culture, *see* **Menziesia**.

B. empetriformis (Crowberry-leaved). *fl.* reddish-purple, clustered near the extremities of the branches. *l.* crowded, linear, on short adpressed petioles. *h.* 6in. North-west America, 1829. SYN. *Menziesia empetrifolia*. (B. M. 3176.)

B. erectus (erect). *fl.* red, pentamerous, broadly campanulate. *l.* linear, obtuse, obscurely serrated. *h.* about 1ft. Siberia. Trailer. (L. & P. F. G. 1, 19.)

B. Gmelini (Gmelin's). *fl.* red; peduncles glandular, many-flowered. *l.* with denticulated margins. *h.* 2in. or 3in. Kamtschatka and Behring's Island.

BRYONIA (from *bryo*, to sprout; in allusion to the annual growth from the tuber). Bryony. ORD. *Cucurbitaceæ*. Tuberous-rooted perennial herbaceous plants, producing annual climbing stems. The native species is well worth growing over unsightly hedges, fences, &c., and in the wild garden; it is a rapid grower, and of extremely easy culture. The stove perennial species should be grown in pots, and the stems trained up the rafters. Rich loam is the soil most suitable for their cultivation. Propagated by seeds, or by divisions of the tuber.

B. dioica (diœcious). *fl.* greenish-white, racemose, diœcious. *fr.* globose, red. May to September. *l.* cordate, palmately five-lobed, toothed, scabrous, from callous points. England. (Sy. En. B. 517.)

B. laciniosa (cut-leaved). *fl.* yellow, solitary; corollas hairy inside, smooth outside. *fr.* size of a cherry, striated with white. July. *l.* palmately five-parted, cordate, rough, and blistered, with oblong-lanceolate, acuminated, serrated segments; petioles muricated. Ceylon, 1710. Stove species. SYN. *Bryonopsis laciniosa*. See Fig. 286.

BRYONY. *See* **Bryonia.**

BRYOPHYLLUM (from *bryo*, to sprout, and *phyllon*, a leaf; plants spring from the notches on the edges of the leaves when taken off the plant, and placed in a moist situation). ORD. *Crassulaceæ*. This very curious stove succulent thrives in pots of rich loamy soil; perfect drainage is essential, and but little water is at any time needed.

B. calycinum (large-cupped). *fl.* yellowish-red; cymes panicled, terminal. April. *l.* opposite, thick, petiolate; some impari-pinnate, with one or two pairs of segments, the terminal one large; others solitary; all ovate and crenated. *h.* 2ft. to 3ft. India, 1806. A fleshy, erect, branched evergreen shrub, grown chiefly for curiosity.

BUCCO. *See* **Agathosma.**

BUCIDA. *See* **Terminalia**.

BUCKBEAN. *See* **Menyanthes**.

BUCKLANDIA (named after Dr. Buckland, a former Dean of Westminster, and Professor of Geology at Oxford). ORD. *Hamamelideæ*. A handsome greenhouse tree, allied to *Liquidambar*. It thrives in rich sandy loam, peat, and leaf mould; or peat may be left out if the leaf soil is good; perfect drainage is also essential. Cuttings of ripened shoots will strike in sandy loam, under a hand glass, with moderate heat. They must be watered carefully, or they are liable to rot off.

> **B. populnea** (Poplar-like). *l.* pale green, large, leathery, cordate, ovate-acute, on long stalks, pinkish when young; stipules very curious, large red, consisting of two leafy oblong plates, placed face to face in an erect position between the leafstalk and the stem. *h.* 100ft. Himalayas, 1875. (B. M. 6507.)

BUCKLER MUSTARD. *See* **Biscutella.**

BUCKTHORN. *See* **Rhamnus**.

BUCKWHEAT. *See* **Fagopyrum esculentum**.

BUCKWHEAT-TREE. *See* **Mylocaryum**.

BUDDING. This process consists of taking an eye or bud attached to a portion of the bark, and transferring it to another and different plant; it is an operation almost confined to woody plants, but has been practised with more or less success upon herbaceous perennials. The stock should not be

budded unless the sap is in circulation, which is assured if the bark will detach itself easily, when gently lifted, from the wood.

There are many ways of performing the different systems, in preparing and inserting the Buds, &c., and all may prove more or less successful if undertaken when the Buds and stock are both in a suitable condition. The principal methods are Shield or T-budding, including the Circular, Square, and Inverted forms; Flute or Tube-budding, and Annular or Ring-budding.

The first-named method, which is fully described below, is very extensively practised for propagating Roses and stone fruits. It is also coming more in use for the propagation of many other fruit trees, including Apples and Pears, especially new or scarce varieties, as the great advantage of making use of many more of the eyes, to form separate trees, is thereby attained. In large nurseries, where skilful propagators are employed, thousands of trees are annually budded, the majority of them with very successful results. It is, in most cases, preferable to purchase established fruit trees, as cultivators require the produce much quicker than they could get it by propagating trees themselves. The same system of Budding is, however, applicable for increasing Roses; and this may be adopted with every chance of success by even a cottager, if he takes the necessary care in performing the work.

Rare varieties of ornamental deciduous trees are largely propagated in this way; for instance, many of the Acers, Elms, Horse Chestnuts, &c. Evergreen shrubs, such as Rhododendrons and Hollies, are also rapidly increased in some establishments by this means.

In the case of fruit-frees, plump wood Buds must be selected, from medium-sized branches. On some sorts these are scarce, the majority being Flower-buds, and it is rather difficult to distinguish between them at the Budding season. The best time for the operation is from June to the end of August; but surrounding influences, condition of Buds, stocks, &c., must be taken into account. Clean cuts, with gentle and skilful handling, are even more important in the Budding of stone fruits than of Roses or other plants, and the ties should be lightly but firmly made. In all cases, the operation must be performed as quickly as possible, as both Bud and bark are injured if exposed to the air for any length of time.



Fig. 287. FIG. 288.

To proceed with the ordinary system of Shield-budding, the stock (see Fig. 287 *a*) should first have a longitudinal and a transverse incision made in the bark, the former about 1in. long. Next, the Bud should be prepared, removing half the leaf (see Fig. 288). Hold the branch with the left hand, and pass the knife from about ½in. below, gradually upwards and inwards under the Bud, bringing it out in a

similar way at a somewhat shorter distance above. A portion of wood will also be taken out, and this is generally removed the opposite way to that in which the Bud has been cut. By skilful Budders, it is removed by a sort of twitch from either end. Great care must be taken not to pull out the base or root of the Bud at the same time, as this would render it useless. Should the whole come out together, leaving a hollow place under the eye of the Bud, it must be thrown away, and another prepared. The Bud being ready, loosen the bark at the point where the incisions meet, with the ivory knife handle, and insert it by means of the piece of leaf attached. It must then be tied in with soft matting or bast, to exclude air, but not tight enough to injure the bark. Shading from bright sun is advisable for a few days afterwards, and, as soon as the union takes place, the ties must be frequently examined, and loosened if necessary. Some prefer Budding late in the season, in order that the Bud may remain dormant during the winter, and breaking stronger the following spring. Occasionally, they are inserted in spring, just at the commencement of growth. The stocks of the Summer-budded trees should only be allowed a moderate amount of foliage during the autumn, and should be cut back to the established Bud before growth commences in spring.

Square and Circular Shield-budding consists in cutting out a piece of bark of either shape from the stock, and inserting another piece of exactly the same size, containing a Bud, and covering with a bandage, or piece of sticking plaster, all except the eye. This mode is seldom made use of. Inverted T or Shield-budding is preferred in the south of France for propagating Orange-trees, but is not otherwise much used. The only difference is that the transverse

incision is made below, instead of above, the other, and the Bud inserted upwards, making it fit with the bark at the point where the stock is cut across.

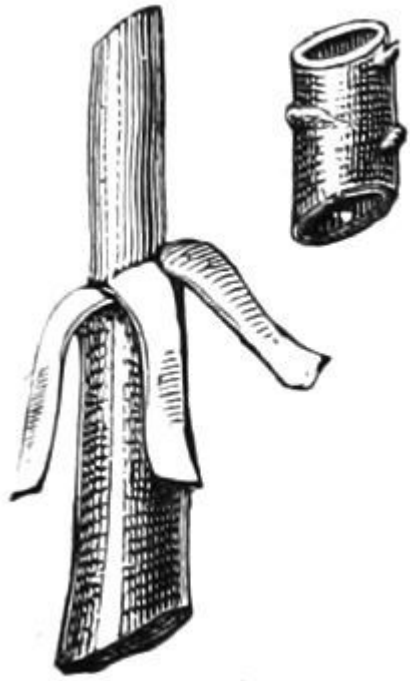


Fig. 289.

Flute-budding is sometimes used, and answers well for some trees (see Fig. 289). A cylinder of bark is removed from the stock, and one of a similar size from the scion. containing Buds, is fitted in its place, being carefully made air-tight by means of a bandage or grafting wax. Some prefer splitting the hark, as shown in the illustration. and laying it over the tube or cylinder; but the parts cannot be fitted so well as when it is removed.

Ring Budding. By this mode, it is not necessary to cut off the top of the stock. A ring of bark may be

removed from any convenient part (see Fig. 290 *b*) and replaced with one containing eyes (see Fig. 290 *a*). The latter should be taken from a little larger branch than the stock, as the bark could then be made to fit better. As in Flute-budding, air must be excluded by means of adhesive paper and bandages or grafting wax.

Budding operations may be performed at any time during the season; but dull cloudy weather, and morning or evening, are most suitable. If the branch, containing Buds, cannot be obtained as required for use, the ends may be placed in water, to keep them fresh; but unnecessary delay should be avoided.

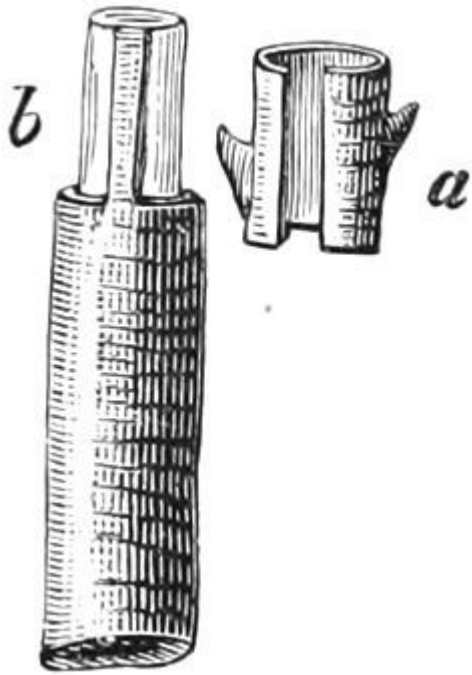


Fig. 290.

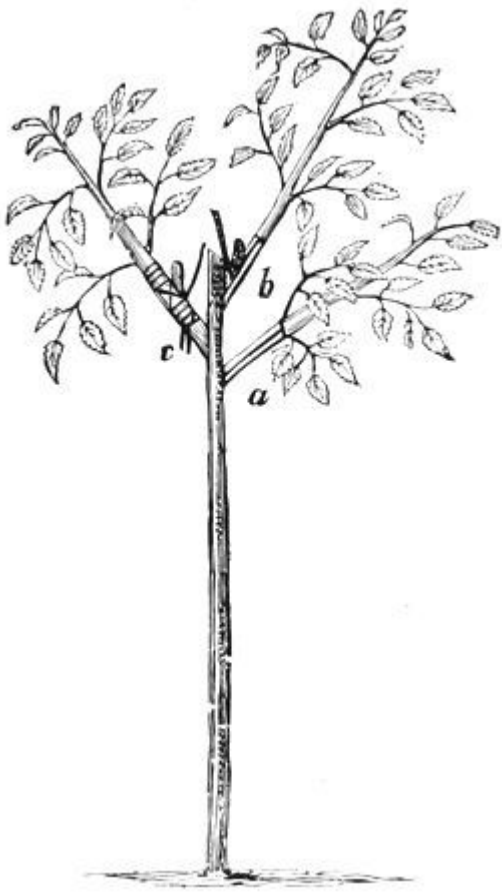


Fig. 291.

Stocks for Budding upon. For the Cherry, the Wild Gean, and seedlings from the Morello. make capital stocks for tall trees and those of moderate growth; and the Mahaleb, or Perfumed Cherry, for small trees for pots, bushes, pyramids, or cordons. For the Plum, the Mussel, Mirabelle, Magnum Bonum, St. Julian, &c., are mostly used for stocks, the Mirabelle being best for small trees. Peaches and Nectarines are generally budded on the Mussel, St. Julian, or

Mirabelle Plums; the last are best for dwarfs. The Apricot is budded on the Mussel or Mirabelle Plums, for small plants; and the St. Julian Plum for standards. In France, the Damas Noir, or Black Damask, and the Cerisette, are also used. They should all be raised from seeds, and not from suckers. Seeds for raising plants for stocks may be sown as soon as ripe; but where quantities are used, the stones are thrown into heaps, so as to slightly ferment during winter. In the spring, they are sown in drills or beds, and transplanted the next year in rows 2ft. or 3ft. apart. and 10in. or 12in. from plant to plant. The dwarfs are generally budded the second year, and the standards the third or fourth. Dwarf trees are budded from within a few inches of the ground to 1ft. above; standards and riders from 3ft. to 9ft.; cordons, pyramids, &c., can hardly be budded too low.

Rose Budding. Propagation of Roses by Budding is very extensively practised both with standard trees and dwarf plants. It is perhaps easier and more certain to succeed with these than with fruit trees; but the mode adopted is precisely the same—that of the shield-shaped Bud with the core, or root, and the bark attached. For standards, the common briar of the Dog Rose is the best. The earlier these are obtained and planted in November, the better, as roots are then formed at once. For dwarf plants, the Manetti stock is mostly used, being easily obtained and had in proper condition almost at any time when Buds are ready. Plants on this stock do not succeed in all soils, and suckers are also very liable to be produced. Budding on the seedling briar is attended with good results, and is practised more than hitherto. The De la Grifferaie stock is also used, more for Tea Roses than others, and is considered by some

to produce better plants than the Manetti. The shoots on standard briars should be reduced to about three of the strongest, selected as close together as possible, and near the top, the briars having been previously cut back the desired height at planting time. Two Buds are sufficient for a good head; but, for certainty, three may be inserted. Fig. 291 represents a tall briar with three shoots; *a* shows the shoot slit for the Bud; *b*, the Bud inserted; *c*, the Bud tied in. Fig. 292 is a branch showing Buds, the lowest ones of which are most suitable, being in firmer wood. Those at the top are often useless. Fig. 293 represents a Bud taken from Fig. 292, *a*, *b*, and Fig. 294 gives an idea of how the wood is removed. As previously remarked when describing the system, experienced Budders remove the wood from either end. Fig. 294 shows its removal from the lower end.



Fig. 292.



Fig. 293. Fig. 294.

Budding as close as possible to the main stem is most desirable. Raffia grass is superior in every way for tying, which should be performed as soon after the Bud is inserted as possible. It requires much care, and, of course, the Bud itself must be entirely free. As soon as the Buds swell, the tying material should be loosened, and the top of the stock cut back to the level of the budded shoot. By Budding late, the Buds lie dormant till the next spring, and the necessity of tying the young shoots is dispensed with for that season. The shoots of the briar in advance of the Rose Buds must be cut back, as shown in Fig. 295, so soon as the Buds are safely established. The Manetti and other dwarf stocks are budded on the main shoot nearly close to, or underneath the ground, and if low enough to cover part of the rose stem when grown, the latter often roots as well and assists the stock. Being small, they may be grown in pots and removed

to the required position at any time.



Fig. 295.

Dog Roses, used for standards, are usually collected from hedgerows, and sold at about 8s. per hundred. Manetti stocks are increased by cuttings, which, after making one season's good growth, will be fit for use. Briars are raised from seed, which may be collected from hedges, and sown in the autumn, in drills. The seedlings should be transplanted the first year after sowing, and the following season they will be ready for working.

BUDDING KNIVES. The best Budding Knives are those manufactured by Messrs. Saynor and Co., and Messrs. G. Hall and Son. They are made with handles of ivory, shaped in different ways at the end, for the

purpose of opening the bark, in order to insert the Bud. Some of the blades are made with the edge rounded at the point, so as to cut the bark without the knife entering the wood underneath (see Figs. 296 and 297). Others, which may be used for Budding, and are much better for ordinary use for cutting flowers, &c., are made with the edge of the blade carried to a point, as in ordinary knives (see Figs. 298 and 299). Another form has the handle made of some other material, and a piece of ivory inserted for opening the bark; this is represented in Fig. 300. The first-named is the best, if required for Budding only; the second is the most useful for ordinary purposes, and answers admirably for Budding as well. None of the other shapes have any material advantages over these.

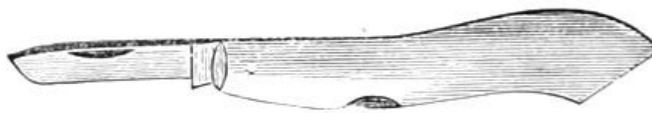


FIG. 296.



FIG. 297.



FIG. 298.



FIG. 299.



FIG. 300.

BUDDING KNIVES.

BUDDLEIA (named after Adam Buddle, who is so often mentioned in Ray's "Synopsis"; his collection of dried British plants is preserved in the British Museum). ORD. *Loganiaceæ*. A large genus of stove, greenhouse, or half-hardy shrubs. Flowers small, often tomentose, axillary, spicate, capitate, or thyrsoid; calyx equally four-toothed; corolla tubular-campanulate, regular; limb spreading, four-toothed. Leaves opposite, reticulately veined. Branches quadrangular.

The species most extensively grown is *B. globosa*, which, among all our other shrubs, is quite unique; but it is only in the southern or favoured counties of England where it can be fairly termed hardy. It is readily propagated by cuttings or by seeds. The latter should be sown in a gentle heat the spring following the ripening, when they will vegetate pretty freely. With careful treatment and nurturing in pots for the first winter, in a frost-proof pit or house, they may soon be grown into elegant plants. Cuttings of the ripened wood, put in under bell glasses or hand lights, in a cool but frost-proof pit, will root slowly during the winter. They will root all the surer and quicker if each cutting has a heel of older wood attached to that of the current year's growth. They are best inserted in fine sand or in very sandy soil, and require but little water until rooted. As soon as fairly calloused over or rooted, their further progress may be much advanced by potting them off, and plunging them in a bottom-heat of 60deg. or 65deg. This is by no means an essential to secure success, but it hastens it, and promotes growth in an extraordinary manner. The surface temperature should range about the same as the bottom-heat.

Under such treatment, the plants will be quite fit to place out about the middle of July. A warm, sheltered situation should be chosen, and a light, rich soil prepared for them; and if dry weather ensues, they only require water. South or west walls are, without doubt, the best situations for them. In all cool or unfavourable localities, much may be done to ensure success by planting on a dry bottom, and on poorish soil. A loose, free-and-easy style of training suits the plants best. This enables them to yield a great number of their peculiarly formed, distinct, and beautiful flowers; whereas, anything like a close, trim course of pruning or of training reduces the flowers to the lowest number.

Throughout the southern parts of England, and, indeed, in many places in the north, *B. globosa* makes an excellent bush for the shrubbery. It is only during severe winters that it gets badly cut.

For the other presumably hardy species much the same plan as the foregoing may be adopted. The greenhouse and stove kinds may have the same routine of culture usually employed with plants requiring similar temperatures.

Stove species, except where specified otherwise.

B. americana (American). *fl.* yellow; spikes disposed in a terminal panicle, nearly 1ft. long; glomerules nearly globose, size of a sloe, on short peduncles. August. *l.* ovate, acuminated, narrowed at the base, serrately crenated. *h.* 8ft. to 12ft. Peru, 1826.

B. asiatica (Asiatic).* *fl.* white, small, disposed in long, dense

racemes. *l.* lanceolate, finely serrated. *h.* 3ft. India, 1874. A graceful and sweet-scented shrub. SYN. *B. Neemda*. (B. M. 6323.)

B. crispa (curled). *fl.* lilac, with a white eye; numerously produced in long terminal branching spikes, forming a pyramidal head about 5in. long. March. *l.* ovate-lanceolate, crenately curled; lower ones cordate at the base; superior ones rounded, all thick and wrinkled, clothed with soft tomentum on both surfaces. *h.* 13ft. Western Himalayas. Half-hardy. (B. M. 4793.)

B. globosa (globose).* *fl.* orange, or honey-colour; heads large, terminal, globose, pedunculate. May. *l.* lanceolate, acuminated, petiolate, crenated, 6in. long. Branches sub-tetragonal, clothed with hoary tomentum, as well as the under side of the leaves. *h.* 15ft. to 20ft. Chili, 1774. Hardy in most places. (B. M. 174.)

B. Lindleyana (Lindley's). *fl.* purplish-red, hairy; disposed in terminal racemose spikes. September. *l.* ovate, shortly petiolate, serrate. Branches angular, glabrous. *h.* 6ft. China, 1844. Half-hardy. (B. R. 32, 4.)

B. Neemda (Neemda). A synonym of *B. asiatica*.

BUDS, FLOWER. These are developed like Leaf-buds, from which they differ chiefly in containing one or more incipient flowers within the leaves—the flowers being wrapped up in their own floral-leaves, within the ordinary leaves, which have their outer covering of scales. If a Bud be gathered from a Lilac or Horse-chestnut very early in spring, all the rudiments of the future flowers and leaves will be found within it, though the Bud itself may not be more than half-an-inch long, and the flowers not larger than the points of the smallest pins.

BUDS, LEAF. These consist of rudimentary leaves, surrounding a growing vital point, and appear like a collection of scales arranged symmetrically one above the other. Leaf-buds universally originate in the horizontal or cellular system, and are formed under the bark at the extremity of the medullary rays, and at the margin or on the surface of leaves, whether perfect or rudimentary. Deciduous trees lose their leaves, but in the axil of each a little Bud previously forms, from which fresh leaves expand the following spring. In some cases, as in the Horse-chestnut, the Buds are covered with a gummy exudation. In Privet-trees, Leaf-buds are generally smaller and more elongated than Flower-buds.

BUETTNERIA (named after David Sigismund Augustus Byttner, once a Professor of Botany in the University of Göttingen). ORD. *Sterculiaceæ*. Erect or scandent stove or greenhouse shrubs. Flowers small, usually dark purple; calyx and corolla valvate; umbels simple, disposed in something like racemes or panicles, rarely in corymbs. Leaves simple. All are of easy culture in a compost of loam and peat. *B. dasyphylla*, *hermanniæ-folia*, *microphylla*, and *scabra*, are occasionally met with, but they are hardly worth

growing.

BUETTNERIEÆ. A section of *Sterculiaceæ*.

BUFF-TIP MOTH (*Pygæra bucephala*). This large and beautiful Moth is very common in many districts; it is easily recognised by the buff-coloured tips of the fore-wings—whence its common name; the head, and body between the wings and abdomen, are ochreous. According to Newman's "British Moths," "the caterpillars, when full grown, are about an inch and three-quarters long, and sprinkled with silky hairs; the general colour yellow, with black head, black lines running from the head to the tail, interrupted by a transverse orange band on each ring, and a black horny plate above the tail segment." They feed on the leaves of the Lime, Elm, and Oak, among other trees, and apparently the only remedy is that generally adopted in exterminating caterpillars, viz., to shake the branches which are infested, when the pest will be quickly dislodged, and fall to the ground. Miss Ormerod is of opinion that "as the caterpillars come down the tree to the ground for their change to chrysalids, it might be worth while to throw a few spadefuls of gas-lime, or of anything they would not cross, in a circle at about a yard from the tree; or a rough band of any material soaked in tar, or tar and oil, which would keep wet longer, would stop them from straying off ... and they might be cleared in sufficient numbers so as to considerably lessen future attack." This plan of prevention deserves a trial in any place where the destructive caterpillars of these Moths abound. It is almost a hopeless task to destroy them altogether when once established on the trees, such specimens as large Oaks being often almost or wholly denuded of foliage.

BUGLE. *See* **Ajuga.**

BUGLOSSUM BARRELIERI. *See* **Anchusa Barrelieri**.

BUGWORT. *See* **Cimicifuga**.

BULBIFEROUS. Bearing bulbs.

BULBINE (from *bolbos*, a bulb). ORD. *Liliaceæ*. A genus of rather pretty hardy, or nearly hardy, herbaceous or bulbous plants, allied to *Anthericum*. Flowers showy, fragrant; perianth with spreading segments. Leaves somewhat fleshy, narrow. Stems short. They are all of easy culture in a compost of sandy loam. The bulbous-rooted species are increased by offsets, and the herbaceous sorts by suckers and divisions. The only species which can be grown satisfactorily in the open air is *B. annua.* All the others should be grown in the greenhouse, but may be placed in the open during the summer months.

B. alooides (Aloe-like).* *fl.* yellow, disposed in a terminal panicle. April. *l.* fleshy, tongue-shaped, lanceolate, flat on both sides. *h.* 1ft. Cape of Good Hope, 1732. SYN. *Anthericum alooides*. (B. M. 1317.)

B. annua (annual). *fl.* yellow; scape racemose. May, June. *l.* fleshy, subulate, rounded. *h.* 9in. Cape of Good Hope, 1731. An annual species, the seeds of which should be sown in a gentle heat during spring, and the seedlings may be transplanted to the open when large enough to handle. SYN. *Anthericum annuum*. (B. M. 1451.)

B. caulescens (caulescent).* *fl.* yellow. March. *l.* fleshy, rounded. Stem shrubby, erect, branched. *h.* 2ft. Cape of Good Hope. 1702. A shrubby species, which should be propagated by cuttings, placed under a hand glass. SYN. *B. frutescens*. (B. M. 816.)

B. frutescens (shrubby). Synonymous with *B. caulescens*.

BULBOCODIUM (from *bolbos*, a bulb, and *kodion*, wool; referring to the woolly covering of the bulbs). ORD. *Liliaceæ*. TRIBE *Colchiceæ*. A very pretty little bulbous plant, much resembling the *Crocus*, from which it differs principally in having a superior ovary and six stamens. It is amongst the earliest of spring-flowering plants, the flowers preceding the foliage; and, like the majority of bulbs, delights in rich sandy loam. In such positions, they multiply rapidly from offsets. It is a good plan to take up the bulbs, divide, and replant them every second year, selecting in autumn, and renewing the soil or planting in new positions. Few plants prove more welcome in the garden, in February, than *B. vernum*, either in beds, patches, or masses.

B. Aitchisoni (Aitchison's). A synonym of *Merendera Aitchisoni*.

B. Eichleri (Eichler's). A synonym of *Merendera caucasica*.

B. trigynum. A synonym of *Merendera caucasica*.



Fig. 301. Bulbocodium vernum.

B. vernum (spring).* *fl.* violet-purple, with a white spot on the claw; long, tubular, funnel-shaped, two to three from each bulb; preceding the appearance of the leaves. Very early spring. *l.* usually three in number, broadly strap-shaped, concave, and surrounded at the base by well-developed sheaths. Bulb black, oblong. *h.* 4in. to 6in. Spain, 1649. See Fig. 301. There is a

variety with the leaves striped white, which is also desirable.

BULBOPHYLLUM (from *bulbos*, a bulb, and *phyllon*, a leaf; referring to the leaves issuing from the apex of the pseudo-bulbs). SYNS. *Anisopetalum*, *Bolbophyllum*, *Tri-brachium*. ORD. *Orchideæ*. Of this rather large genus of orchids but few are worth cultivating except as curiosities. Racemes long or spike-like, very rarely one-flowered or sub-umbellate; sepals usually nearly equal and free; lip jointed to the foot of the column. They are of easy culture when grown on small blocks of wood with a little moss, and suspended in a warm part of the house; the roots require a good supply of water. Propagated by dividing the pseudo-bulbs.

The following comparative few of the aggregate number of species already introduced are really all that are worth the cultivator's attention; what the botanist often regards as being very pretty, &c., does not always appear such in the eyes of the grower.

B. barbigerum (bearded).* *fl.*, sepals and petals greenish-brown; lip covered with dark-coloured hair, and so loosely attached at the base as to be moved with the slightest breath. Sierra Leone, 1835. A curious dwarf-growing plant, with dark green leaves and pseudo-bulbs. (B. R. 1942.)

B. Beccarii (Beccari's). *fl.* light brownish and painted with violet; lip brown, with a violet hue, proceeding from a rhizome at the base of the leaf (just below the small pseudo-bulb), and at once turning

downwards; racemes dense, cylindrical, nodding. *l.* three, 25in. long, 18in, across, very thick. Rhizome 20in. long. Brazil, 1879. A remarkable and gigantic climbing species; the odour of this plant is intolerably fœtid and the leaves are larger than those of any other known orchid. This species requires plenty of heat. (B. M. 6517.)

B. Lobbi (Lobb's).* *fl.* large; sepals and petals yellow, the upper part spotted with purple; solitary, on radical scapes. Summer. Java, 1845. (B. M. 4532.)

B. maculatum (spotted). *fl.* prettily spotted, *l.* long, obtuse, bright green. India.

B. reticulatum (netted-leaved).* *fl.* in pairs, white, striped inside with purple; lip spotted with the same colour. *l.* somewhat heart-shaped, with the nerves of a deeper green than the rest of the leaf, giving it a beautifully reticulated appearance. Brazil, 1866. Perhaps the handsomest of the genus. (B. M. 5605.)

B. saltatorum (dancing). *fl.* greenish-brown, lasting some time in perfection. Winter. *h.* 6in. Sierra Leone, 1835. (B. R. 1970.)

B. siamense (Siamese).* *fl.* pale yellow, striped with purple; lip

yellow, streaked with purplish lines. A very pretty species, closely allied to *B. Lobbi*, but with longer and stouter leaves. Pseudo-bulbs ovate. Siam, 1867. Should be grown in a pot of peat and sphagnum.

BULBOSTYLES (from *bolbos*, a bulb, and *stylos*, the style). ORD. *Compositæ*. A. small genus of stove evergreen plants, now referred to *Eupatorium*.

BULBS. A Bulb is formed upon or beneath the ground, and is a swollen stock, consisting, in the first place, of a more or less fleshy disk, which below gives rise to the roots; secondly, of more or less fleshy coats, or scales, borne on the disk; thirdly, of a more or less central shoot, equally borne by the disk, protected by the coats or scales already mentioned, and formed of rudimentary leaves and flowers. In some instances, small Bulbs, called Cloves, are formed at the base of the scales of the original Bulb; these are destined to reproduce the plant. Shallot and Garlic are good examples. Bulbs are, in fact, storehouses, husbanding the strength and energy acquired by the plant during one season, for the exigencies of the next. They are classified under two sections—Scaly and Tunicated. In the former, the scales of the Bulb are imbricated, as in the Lily; in the latter, they form continuous coatings, one within the other, as in the Hyacinth, &c. In several Lilies, young Bulbs are found growing in the axils of the leaves, when they are known as Bulbils. Bulbs is also a popular term given to Dutch Flower Roots, mostly arriving here in the autumn for spring flowering. Crocus, Colchicum, Cyclamen, Gladiolus, and several others, are not Bulbs, but Corms. The flowering season varies according to the different sorts of

Bulbs. The majority may be lifted and kept tolerably dry during the resting period; but they wither and become exhausted if not replanted at the proper time, thereby causing many failures. Dutch Bulbs generally arrive in September, and the best results are obtained from those potted or planted at once, although some for succession may be kept in reserve up till the beginning of November. The failure in cultivating imported Liliums and other Bulbs may be often caused by their long-continued confinement in a dry atmosphere, whereby their vitality is often almost lost. The roots of some Bulbs are nearly always, more or less, in action, and these, especially, should not be kept out of the ground for any length of time.

BULLACE. *See* **Prunus insititia**.

BULLACE, or **MUSCADINE**. *See* **Vitis vulpina**.

BULLATE. Blistered or puckered.

BULRUSH, or **CLUB-RUSH**. *See* **Typha**.

BUNCHOSIA (from *bunchos*, the Arabic name for Coffee; in allusion to the similarity between the seeds of this genus and those of Coffee). ORD. *Malpighiaceæ*. Ornamental greenhouse evergreen shrubs, nearly allied to *Malpighia*, but having the racemes of flowers axillary. Fruit fleshy, indehiscent, externally smooth, and containing two or three seeds. They thrive best in a compost of loam, peat, leaf soil, and sand, in about equal proportions. Cuttings of ripened shoots will root in sand under a bell glass, in moist bottom heat, taking several weeks to do so. Good drainage is essential, both in striking cuttings and in the cultivation of the plants.



Fig. 302. Burbidgea nitida.

B. argentea (silvery).* *fl.* yellow; racemes opposite, simple, pubescent. July. *l.* lanceolate, silvery beneath. Branches puberulous. *h.* 10ft. Caraccas, 1810.

B. glandulifera (gland-bearing). *fl.* yellow; racemes simple, axillary. March to May. *l.* elliptical-ovate, on short petioles, wavy, pubescent on both surfaces, furnished with four glands beneath at the base. *h.* 10ft. Caraccas, 1806.

B. nitida (shining). *fl.* yellow; racemes elongated, almost the length

of the leaves. July. *fr.* large, red; it is much eaten by turkeys and other large fowl. *l.* 4in. long, oblong, acuminated, smooth, glandless. *h.* 4ft. Jamaica, 1800.

B. odorata (fragrant).* *fl.* yellow, sweet-scented; racemes opposite. May. *l.* ovate, emarginate, downy on both surfaces. *h.* 7ft. Carthagena, 1806.

BUPHTHALMUM (from *bous*, an ox, and *ophthalmos*, the eye; the disk of the flower being ox-eye-like). Oxeye. ORD. *Compositæ*. Very showy and ornamental hardy perennial plants, thriving freely in common garden soil. They are propagated by divisions, made in autumn or spring.

B. grandiflorum (large-flowered).* *fl.-heads* yellow, large; involucre naked. June to October. *l.* alternate-lanceolate, somewhat toothleted, smooth. *h.* 1½ft. Austria, 1722. Hardy herbaceous perennial.

B. salicifolium (Willow-leaved).* *fl.-heads* yellow, solitary, rather large, terminal; involucre naked. June. *l.* alternate, oblong-lanceolate, sub-serrated, three-nerved, villous. *h.* 1½ft. Austria, 1759. Hardy herbaceous perennial.

B. speciosissimum (showiest).* *fl.-heads* yellow. July. *h.* 2ft. South Europe, 1826. Hardy herbaceous perennial. SYN. *Telekia speciosissima*.

BUPLEURUM (derivation not satisfactorily explained). Hare's-Ear. ORD. *Umbelliferæ*. A somewhat extensive genus of quite glabrous shrubs or herbaceous plants. Flowers yellowish; umbels compound. Leaves mostly quite entire. But few of this genus are worth growing, and all are of the easiest culture in common garden soil. Seeds of the annuals may be sown out of doors in March or April; divisions of the herbaceous perennials made in autumn or spring; and cutting or divisions of the greenhouse species, in March or April.

B. fruticescens (shrubby).* *fl.*, umbels small, three to five-rayed; involucre of three to five, very short, subulate leaves. August. *l.* linear-subulate, stiff, striated, five to seven-nerved. Branches slender, elongated, erect. *h.* 1ft. Spain, 1752. Hardy and evergreen.

B. fruticosum (shrubby).* Leaves of involucre oblong. July. *l.* of a sea-green colour; oblong, attenuated at the base, coriaceous, one-nerved, quite entire, sessile. Bark of branches purplish. *h.* 3ft. to 6ft. Spain, 1596. Hardy. This is nearly the only species grown. (W. D. B. 1, 14.)

B. gibraltarica (Gibraltar). *fl.* yellow. June. *l.* lanceolate, one-nerved, coriaceous. *h.* 3ft. Gibraltar, 1784. Evergreen, half-hardy.

B. graminifolium (Grass-leaved).* *fl.* green-yellow. June. *l.* linear, grass-like. *h.* 6in. Switzerland, 1768.

Hardy perennial.

B. longifolium (long-leaved). *fl.* green-yellow. June. *l.* ovate-oblong; radical ones stalked; cauline ones amplexicaul. *h.* 3ft. Switzerland, 1713. Hardy perennial.

BUR. *See* **Centotheca lappacea**.

BURBIDGEA (named after F. W. Burbidge, the discoverer of the genus, a traveller in Borneo, and author of several horticultural works). ORD. *Scitamineæ*. A very large, brilliant-flowered stove herbaceous perennial, allied to *Hedychium*. For culture, *see* **Alpinia.**

B. nitida (shining).* *fl.*, perianth-tube 1in. to 1½in. long, slender; outer segments 1½in. to 2in. in diameter, bright orange-scarlet; panicle terminal, 4in. to 6in. long, many-flowered. Summer. *l.* 4in. to 6in. long, elliptic-lanceolate, cordate-acuminate, rather fleshy, bright green above. Stems tufted, 2ft. to 4ft. high, slender, terete, leafy. N. W. Borneo, 1879. See Fig. 302, for which we are indebted to Messrs. Veitch and Sons. (B. M. 6403.)

BURCHARDIA (named after H. Burchard, M.D., a botanical author). ORD. *Liliaceæ*. An ornamental greenhouse herbaceous perennial, allied to *Androcymbium*. It thrives best in sandy peat, or peat mixed with a little loam. Propagated by offsets or divisions, made just previous to potting, in spring. It

is best to repot annually. Good drainage should be allowed, and the plant must not be potted too firmly.

B. umbellata (umbelled). *fl.* white, green. August. *h.* 2ft. New Holland, 1820.

BURCHCHELLIA (named after W. Burchell, a botanical traveller in the Cape of Good Hope, and in Brazil). ORD. *Rubiaceæ*. A stove evergreen shrub from the Cape of Good Hope. Flowers scarlet, disposed in heads at the tops of the branches, sessile upon a villous receptacle, intermixed with small distinct bracteoles; and each head is propped up by the ultimate pair of leaves; corolla of a clavate-funnel-shape. Leaves ovate, acute, a little cordate at the base, petiolate; stipules interpetiolar, broad, cuspidate at the apex, deciduous. It grows well in a rich light soil, or a mixture of turfy loam, turfy peat, and sand. Cuttings, not too ripe, root readily if planted in sand, and placed under a hand glass, in a gentle heat.

B. bubalina (buffalo). A synonym of *B. capensis*.

B. capensis (Cape).* *fl.* deep scarlet, nearly 1in. long. March. *l.* ovate, acute, clothed with hispid pubescence; stipules very broad, and very short. *h.* 3ft. to 5ft.; 12ft. to 14ft. in a wild state. SYN. *B. bubalina*. (B. M. 2339.)

BURLINGTONIA (named after the "amiable and accomplished" Countess of Burlington). ORD. *Orchideæ*. A small genus of epiphytal orchids, all of

which are beautiful and eminently well worth growing. They may be grown upon small blocks of wood, or in rustic baskets, suspended from the roof of the plant stove, where, if liberally treated with water, and a genial moisture in the air during the growing season, very little else will be required to ensure health and vigour. In the dull days of winter, they should be watered less frequently, but the plants must not be allowed to exhibit the slightest signs of distress from drought, or the consequences may be fatal to their health. When fastening these plants to blocks of wood, a little sphagnum should be used, for experience proves that they thrive best when their thin white roots can escape and hang exposed to the air. If growing them in baskets, it is preferable first to fasten them securely upon small pieces of bare cork, then to fill the basket, and finally to cover the whole thinly with a layer of sphagnum.



Fig. 303. Flower-spike, Pseudo-bulb, and Leaf of Burlingtonia decora.

Generally speaking, this genus is not a difficult one to cultivate; its great enemy is a small white scale, which secretes itself in the sheathing bases of the leaves. Here it rapidly multiplies, to the great detriment of the plants; the leaves soon turn yellow at the base, and drop off; the whole plant looks sickly, and soon dies, or else requires a very long time and much trouble to achieve its recovery to

health. To prevent this, the bases of the leaves must be carefully looked into every time the plants are taken down to be dipped in water; and, should the slightest sign of this pest appear, a thorough washing with soft soap and tepid water must be given, repeating the operation every day until all traces of the insect are removed. Red thrip are also apt to work much mischief with these plants. They take up their abode in the same way as the white scale, and if not speedily removed or destroyed, soon make sad havoc. To put a stop to the ravages of this pest, a wash should be given, as before recommended, and after the soap has been rinsed out of the base of the leaf, a little tobacco powder should be sprinkled into the hollows, and allowed to remain for a day or two before brushing it off. This process will, however, cause a somewhat dirty appearance, but it will ensure ultimate health and vigour. Propagated by dividing the plants.

B. Batemanni (Bateman's).* *fl.* white, deliciously-scented; lip beautiful mauve. A very pretty South American species, resembling *B. candida*.

B. candida (white).* *fl.* snowy-white, with a slight stain of yellow on the upper part of the lip, in substance and appearance like white satin, trimmed with gold; large, sweet-scented, in gracefully drooping three to four-blossomed racemes, produced from the axils of the leaves. April and May, lasting about three weeks in perfection, and sometimes having a second

flowering season. *l.* one or two in number, dark green, and firm in texture. *h.* 1ft. Demerara, 1834. A very compact species, well suited for basket culture; it should never be allowed to get dry. It may be distinguished from other species by having a single row of tubercles, forming a ridge upon each side of the slightly hastate lip. (B. R. 1927.)

B. decora (comely).* *fl.* white or rose-coloured, spotted with red; lip pure white; scapes erect, five to ten-flowered. Winter. Brazil, 1852. This species differs entirely from *B. candida*, inasmuch as it possesses a long slender-rooting stem, from different parts of which arise small oval pseudo-bulbs, each bearing a leaf; a lesser leaf appears at the base of a bulb, and from the axil of this the scape springs. It is a rather straggling but nevertheless beautiful species, and is best grown fastened upon long strips of cork, a little sphagnum being used in the operation; whilst, to prevent the plant getting too much "away from home," the young growths should be twisted back as they advance, and the practice continued until the pseudo-bulb is ultimately left near the centre, or in any spot which may appear bare. It likes strong heat and a very moist atmosphere, when growing; but during the period of

rest, it should be kept cool and dry. See Fig. 303. (B. M. 4834.)

B. d. picta (painted).* A beautiful variety, differing from the type in having shorter and more acute leaves; flowers produced in greater profusion, rose-coloured, beautifully mottled and blotched with dark purple. October. Brazil. (B. M. 5419.)

B. fragrans (fragrant).* *fl.* very gratefully fragrant, disposed in erect racemes. April, remaining in perfection about three weeks. *l.* long, rigid, dark green. Habit compact. Brazil, 1850.

B. pubescens (downy). *fl.*, sepals and petals snow-white; distinguished by the somewhat hastate lip, which has three yellow ridges on each side, and also by the downy column. November. *h.* 6in. Brazil, 1850.

B. rigida (rigid).* *fl.* purplish-white, spotted with pink on the lip; produced in heads. *h.* 1ft. Brazil, 1838. A handsome plant, but difficult to flower. (L. S. O. 36.)

B. venusta (charming).* *fl.* white, slightly tinted with pink; produced in heavy pendulous clusters at various seasons of the year; lip stained with yellow. *l.* rigid, dark green. Brazil, 1840. It forms a compact mass, and requires less heat

than the kinds previously described. It is often confounded with *B. pubescens*, from which it may be distinguished by its larger and more loosely arranged flowers, by its smooth column, by the lip not being hastate in shape, and by the numerous shallow ridges borne near the base upon each side. (L. S. O. 2.)

BUR MARIGOLD. *See* **Bidens.**

BURNET (*Poterium Sanguisorba*; from *poterion*, a cup; being used in cooling drinks). ORD. *Rosaceæ*. A native perennial. The leaves are sometimes used in soups, and with Borage in cooling drinks; they are also put in salads. The foliage only being useful, keep the flower-spikes removed, as this tends to increase the luxuriance of the plants. It thrives in any light soil. Propagated by division.

BURNET SAXIFRAGE. *See* **Pimpinella**.

BURNING BUSH. *See* **Euonymus atropurpureus** and **E. americanus**.

BURN ONION. *See* **Potato Onion**.

BUR REED. *See* **Sparganium**.

BURSARIA (from *bursa*, a pouch; the capsules very much resemble those of the Shepherd's Purse). ORD. *Pittosporaceæ*. A handsome, much-branched, greenhouse evergreen shrub, forming a very pretty object when covered all over with its elegant white blossoms. It thrives well in a compost of sandy loam and peat, in equal proportions. Young cuttings will root freely in sand, under a bell glass, with a little bottom heat.

B. spinosa (thorny).* *fl.* white, small, disposed either in lateral or terminal panicles. July to December. *l.* small, oblong-cuneated, entire. *h.* 10ft. New Holland, 1793. (B. M. 1767.)

BURSERA (named after Joachim Burser, a disciple of Caspar Bauhin). ORD. *Burseraceæ.* Stove balsam-bearing trees. Flowers polygamous, or hermaphrodite; calyx small, four to six-toothed; petals four to six, spreading, generally valvate in æstivation; stamens eight to twelve; disk annular, with usually six to ten teeth; drupe oblong, covered by a three-valved succulent rind, containing three to five nuts. They thrive in a compost of loam and peat. Propagated by cuttings, placed under a glass, with bottom heat.

B. gummifera (gum-bearing). *fl.* whitish, hexandrous; racemes terminal and axillary. *l.* deciduous, usually impari-pinnate; leaflets ovate, acute, membranous. *h.* 60ft. West Indies, 1690.

B. serrata (serrate).* *fl.* whitish, decandrous; panicles axillary, shorter than the leaves. *l.* impari-pinnate, with three to five pairs of broad-lanceolate, bluntly-acuminated, serrulated leaflets; petioles and pedicels pubescent. *h.* 25ft. India, 1818.

BURSERACEÆ. An order of shrubs or trees, abounding in resinous juice; with opposite

compound leaves, full of pellucid dots, and axillary and terminal fascicles of flowers. Fruit indehiscent, somewhat drupaceous. The genera best known are *Amyris*, *Balsamodendron*, *Boswellia*, *Bursera*, and *Canarium*.

BURTONIA (named after D. Burton, a plant collector for Kew Gardens). ORD. *Leguminosæ*. A genus of handsome greenhouse dwarf Heath-like shrubs, natives of West Australia. Flowers axillary, often thickly gathered at the ends of the branches; corollas rich purple; keel generally of a deeper colour, and the standard having sometimes a yellow blotch at its base. Leaves simple or trifoliolate, sessile, usually awl-shaped. They thrive well in a mixture of loam, peat, leaf soil, and sand, in equal proportions, with thorough drainage; but care must be taken not to give them too much water, as they require to be kept moderately dry, and are difficult to preserve in a living state. Young cuttings root freely in a pot of sandy soil, in a cool house, with a bell glass placed over them; but some of the species produce seed in abundance, which are the best means of increasing them.

B. conferta (cluster-flowered).* *fl.* violet. July. *l.* simple, very much crowded, six to eight lines long, linear-subulate, with revolute margins, and are, as well as the branches, smooth. *h.* 2ft. 1830. (B. R. 1600.)

B. minor (smaller). A synonym of *Gompholobium minus*.

B. pulchella (beautiful). A synonym of *B. scabra*.

B. scabra (rough).* *fl.* purple; peduncles axillary, bi-bracteate. April. *l.*, leaflets glabrous, linear-mucronate. Branches puberulous. *h.* 2ft. 1846. SYN. *B. pulchella*. (B. M. 5000.)

B. villosa (villose). *fl.* purple, large; peduncles axillary, bi-bracteate. May. *l.*, leaflets linear-subulate, bluntish, scabrid. *h.* 2ft. 1846. (B. M. 4410.)

BUSHEL. *See* **Measures**.

BUTCHER'S BROOM. *See* **Ruscus aculeatus**.

BUTEA (commemorative of John, Earl of Bute, once a munificent patron of botany). ORD. *Leguminosæ*. A genus of very ornamental stove evergreen unarmed trees. Racemes many-flowered; flowers three together, on short pedicels, and furnished with two bracteoles each, under the calyx; corolla deep scarlet; down on the calyces usually black and velvety. Leaves pinnately-trifoliate; leaflets large, ovate, roundish, stipellate. For culture, &c., *see* **Erythrina**.

B. frondosa (leafy). *fl.* 2in. long. *l.*, leaflets roundish, obtuse, or emarginate, rather velvety beneath. Branches pubescent. *h.* 40ft. India, 1796. (B. F. S. 176.)

B. superba (superb).* *l.*, leaflets roundish, obtuse, velvety beneath. Branches glabrous. Coromandel, 1798. This approaches the preceding species, from which it differs mainly by its scandent habit, and not by any

botanical characters. (B. F. F. 143.)

BUTOMACEÆ. An order of aquatic plants, now usually included under *Alismaceæ*.

BUTOMUS (from *bous*, an ox, and *temno*, to cut; in reference to the sharp leaves, which injure the mouths of cattle that browze upon them). Flowering Rush. ORD. *Alismaceæ*. A very handsome hardy perennial aquatic, of extremely easy culture on the margins of ponds or muddy banks. Propagated by divisions of the roots, in spring.

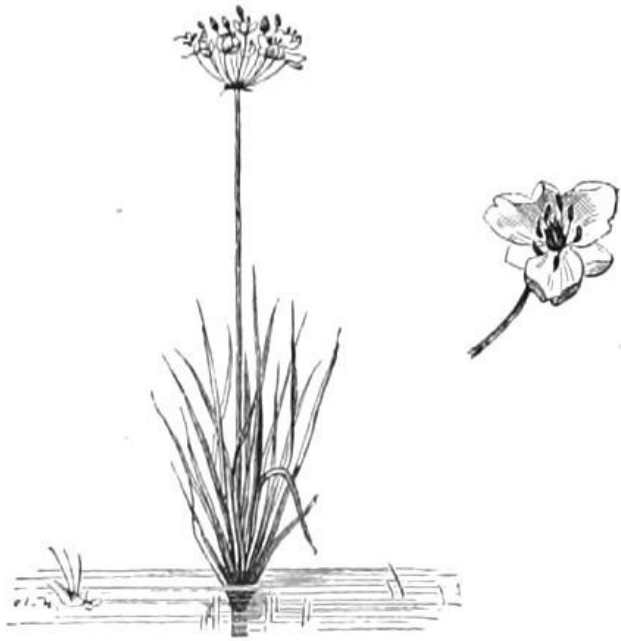


FIG. 304. BUTOMUS UMBELLATUS, showing Habit and single Flower.

B. umbellatus (umbelled).* *fl.* rose-coloured, umbellate; pedicels with scariose sheathing bracts at the base;

scape naked, terete, longer than the leaves. Summer. *l.* all radical, 2ft. to 3ft. long, linear, acuminate, triquetrous. Ditches and ponds; frequent in England, and rare in Ireland. See Fig. 304.

BUTTER AND EGGS. The double-flowered variety of **Narcissus aurantius** (which *see*).

BUTTER AND TALLOW TREE. *See* **Pentadesma**.

BUTTER-BUR. *See* **Petasites vulgaris**.

BUTTERCUPS. *See* **Ranunculus**.

BUTTERFLY ORCHIS. *See* **Habenaria bifolia** and **H. chlorantha**.

BUTTERFLY PLANT. *See* **Oncidium Papilio**.

BUTTER NUT. *See* **Caryocar** and **Juglans cinerea**.

BUTTERWORT. *See* **Pinguicula**.

BUTTON FLOWER. *See* **Gomphia**.

BUTTON-TREE. *See* **Conocarpus**.

BUTTON-WOOD. *See* **Cephalanthus**.

BUXUS (from *pyknos*, dense; referring to the hardness of the wood). Box Tree. ORD. *Euphorbiaceæ*. A genus of hardy evergreen shrubs or small trees. Flowers unisexual, monœcious; male flowers, calyx of four minute segments, stamens four, inserted under the rudiment of a pistil; female flowers singly, at the tips of groups of male ones. Fruit, a regma, leathery, beaked with the styles. Leaves simple, opposite, exstipulate, evergreen. These well-known plants thrive in any light, well-drained soil. Seeds should be sown in similar situations as soon as ripe. Cuttings, made of the young shoots, from 4in. to 6in.

in length, inserted in a shady place, in August or September, root readily. Layers of either young or old wood, made in autumn or early spring, will make good plants. They can also be increased by suckers and division.

B. balearica (Balearic).* *l.* yellowish-green, oblong-elliptical, emarginate, coriaceous, about 2in. long, with a cartilaginous margin. *h.* 15ft. to 20ft. South Europe, 1780. This is a handsome species. The cuttings will require a shelter in winter, and in exposed situations it will be better to afford the plants protection.

B. sempervirens (evergreen).* Common Box. *l.* oval-oblong, retuse, convex, coriaceous, shining; stalks slightly hairy. *h.* various. England. There are numerous forms of this popular shrub: *argentea*, silver-variegated; *aurea* has its leaves variegated with a golden colour; *marginata* has leaves with a golden margin; *myrtifolia* has small, oblong, narrowish leaves; *obcordate-variegata* is a variegated variety, with obcordate leaves, from Japan; *suffruticosa* is the form usually cultivated for edgings, its leaves are small, obovate, this is readily increased by divisions, and requires to be planted firmly, in order to keep it dwarf.

BYRSONIMA (from *byrsa*, a hide, and *nimius*, much used; because the bark of some of the species is used in tanning, in Brazil). ORD. *Malpighiaceæ*. Ornamental stove evergreen trees or shrubs. Flowers racemose, terminal, simple or branched. All the species thrive very well in any light soil, or a mixture of loam and peat. Cuttings made of half-ripened shoots will root freely in sand, under a hand glass, in a moist bottom heat.

B. altissima (tallest).* *fl.* white; racemes clothed with rufous hairs. July. *l.* ovate-oblong, covered with rufous down beneath, but beset with bristles above, which are fixed by the centre. *h.* 60ft. Guiana, 1820.

B. chrysophylla (golden-leaved).* *fl.* yellow; racemes simple. August. *l.* oblong, short, acuminated, acute at the base, rather wavy on the margin, and revolute, smooth above, clothed beneath with silky down, which is of a rusty golden colour. *h.* 14ft. South America, 1823.

B. coriacea (leathery-leaved). *fl.* yellow, sweet-scented; racemes densely spiked, pubescent, erect. May. *l.* ovate, acute, quite entire and smooth. *h.* 30ft. Jamaica, 1814.

B. crassifolia (thick-leaved). *fl.* yellow; racemes erect, elongated, brownish-velvety. July. *l.* ovate, acute at both ends, at length smooth above, but clothed with brownish down beneath. *h.* 6ft. Guiana, 1793.

B. lucida (shining).* *fl.* pink; petals hastately kidney-shaped; pedicels hispid; racemes spiked, erect, short, smooth. May. *l.* obovate, cuneiform, obtuse, or mucronate, smooth, veinless, shining. *h.* 8ft. Caribbee Islands, 1759. Described as "a beautiful shrub."

B. verbascifolia (Verbascum-leaved). *fl.* yellow; racemes terminal. July. *l.* lanceolate-obovate, quite entire, downy on both surfaces. *h.* 6ft. Guiana, 1810.

BYSTROPOGON (from *byo*, to close, and *pogon*, a beard; in reference to the throat of the flower being closed up with hairs). ORD. *Labiatæ*. Greenhouse evergreen sub-shrubs, nearly allied to *Mentha*. Flowers small, in dichotomous, sub-corymbose, or panicled cymes; or else disposed in dense spicate whorls. Bracts lanceolate or subulate. This genus contains easily cultivated species, which are, however, of no value for garden purposes.

CAA-CUYS. *See* **Ilex paraguariensis**.

CAA-MINI. *See* **Ilex paraguariensis**.

CAAPEBA. *See* **Cissampelos Pareira**.

CAAPIM DE ANGOLA. *See* **Panicum spectabile**.

CAA-QUAZU. *See* **Ilex paraguariensis**.

CABARET. The French name of *Asarum europæum.*

CABBAGE. The common name for *Brassica*; but especially applied to the plain-leaved hearting garden varieties of *Brassica oleracea*. To obtain good

tender Cabbages in early spring and throughout the summer, it is necessary that they should be planted on rich, deeply-trenched ground, in a position free from the shade of fruit or other trees. Stable dung or good farmyard manure is best for this crop, and should be applied when trenching is being done, burying the manure a spit below the surface. Cabbages should not be planted successionally on the same ground, nor should they follow any of the other species of *Brassica*, if it can be avoided. A warmer position, not too much sheltered to make the plants tender, will be found beneficial for the earliest spring crop. This should not be planted too soon in autumn, as the plants are more subject to run to seed, especially if the winter be mild. The several forms of Cabbage are well known, being so much cultivated by cottagers as well as gardeners. None of those forming close hearts will bear severe frost, but the Savoys are improved by a little in the early autumn. The Coleworts are very useful in winter, being perhaps the hardiest of all; and, as the hearts do not get so close and hard as the Savoy and other Cabbages, the frost, unless it is very severe, does not injure them so much.

Cultivation. The crop obtained in April and May is usually the most important one, young Cabbages being then much appreciated by everyone. The time for seed-sowing varies in different localities, from the third week in July to the middle of August. The first date would probably prove suitable for the northern parts of the country; and the latter would be early enough for the south. The seed should be sown thinly in beds of rather light, well pulverised soil, afterwards covering these with netting, to protect the seed from birds. The plants will be ready, in most cases, for placing out during September, or as soon

as the ground can be cleared of other crops and prepared for their reception. The Early Battersea, or one of its many allied sorts, is best for sowing at this season; and, when planting out, an allowance of 2ft. apart each way will be sufficient. Seed should again be sown on a mild hotbed in February, and occasionally afterwards, for succession; and a second crop may be obtained from the plants put out in autumn if they are allowed to remain. Drumhead and other strong-growing sorts, sown in spring, will require from 6in. to 1ft. more space when planted out. These are not, however, of such good quality as the smaller-growing varieties.

Savoys. The seed of these should be sown in March or April, according to the locality, in the same way as described above, in seed beds; and the after treatment is also very similar. The young plants must not be allowed to starve in the seed bed, but should be kept watered, and planted out in June and July, choosing dull weather for the operation. The ground should occasionally be hoed between the plants, to keep the surface open and destroy weeds. Distances of from 15in. to 30in. between the plants, according to the variety, must be allowed. See Fig. 305.



Fig. 305. Savoy Cabbage.

Coleworts. Seed of these should be sown about the end of June, and planted out 1ft. apart on a sheltered border, when large enough. Rosette is one of the best varieties; but the early Cabbages are often grown and used as Coleworts before they have had time to form close hearts.



Fig. 306. Early York Cabbage.

Pickling Cabbage. The Red Dutch is the variety generally grown for pickling, and is probably the best to keep its colour when so treated. Seed should be sown in August, to stand the winter, and again in February for a succession; only a few plants will, in the majority of cases, be required, as, if liberally treated, they grow to a good size.



Fig. 307. Oxheart Cabbage.

Sorts of White Cabbage. These are extremely numerous, and selections or improved forms are of annual appearance. Some of the old types are, however, still much cultivated. The following are a selection of the best sorts for general purposes: Atkins' Matchless, Carter's Heartwell, Early Battersea, Early York (see Fig. 306), Ellam's Early Dwarf, Enfield Market, Little Pixie, Oxheart (see Fig. 307), St. John's Day (see Fig. 308), Sugarloaf, Wheeler's Imperial, and Portugal or Couve Tronchuda. The last-named variety was introduced from Portugal some years ago, where it is much grown. It has a large

midrib, and does not form very close hearts. It is very tender when cooked, and is only suitable for culture in summer. Under the name of Gilbert's Cabbage Broccoli, or Chou de Burghley, a variety of Cabbage was recently distributed which produces, if left long enough, hearts resembling Broccoli. Although there are different opinions as to its merits, it is said to be very tender when cooked, and is considered a decided acquisition.

Of Savoys, the best are: Drumhead, Dwarf Green Curled, Early Ulm, Large Late Green, and Tom Thumb.



Fig. 308. St. John's Day Cabbage.

Insects, &c. The majority of the Cabbage tribe is attacked by a very large number of different caterpillars and other pests, both above and below ground. The plants in their young stages are always a prey for snails and slugs, and often require a dusting of soot and lime as a protection. When planting out, many of the plants are often found with a protuberance at the root, caused by an insect, and termed "clubbing." Those so injured should be thrown away if they can possibly be spared, and the others dipped in a thick solution of soot water. This is the worst kind of disease the Cabbage tribe is subject to. The caterpillars of several moths and butterflies are very destructive in summer, often eating through the hearts of Cabbages and Cauliflowers, and so rendering them totally unfit for use. Hand-picking, or dusting with lime, is apparently the only means of diminishing the numbers of these pests.

CABBAGE CATERPILLARS. *Large Cabbage White* (*Pieris brassicæ*). From May to July, and again in September and October, this, the most common of our butterflies, may be seen in great numbers, frequenting gardens, lanes, and fields, being especially numerous where Cabbages are growing. Their beautiful yellow eggs are laid singly on the under surface of the leaves, and securely fastened by a natural glue; from these, in due time, issue the small, but destructive, "green caterpillars." Shortly after birth, they become quite green in front and yellow behind. They then get hairy and dotted over with black; they have eight pairs of feet, of which the three front ones only are "true" legs, or those which ultimately develop into the legs of the butterfly. They change their skin several times, and at each moult become larger in size. When full grown, they

are about 1½in. long, of a light green or bluish hue above, and yellow beneath; along the back of the adult caterpillar is a conspicuous yellow line, edged on each side with black dots.



Fig. 309. Caterpillar and Chrysalis of Large Cabbage Butterfly.

The chrysalis, or pupa, is commonly found on window-ledges, palings, walls, and similar places; but is sometimes attached to the plant (see Fig. 309). It is a rather curious object, of the colour of stone,

and prettily chiselled. It is fastened to the plant by the tail and by a belt of silk round the middle.

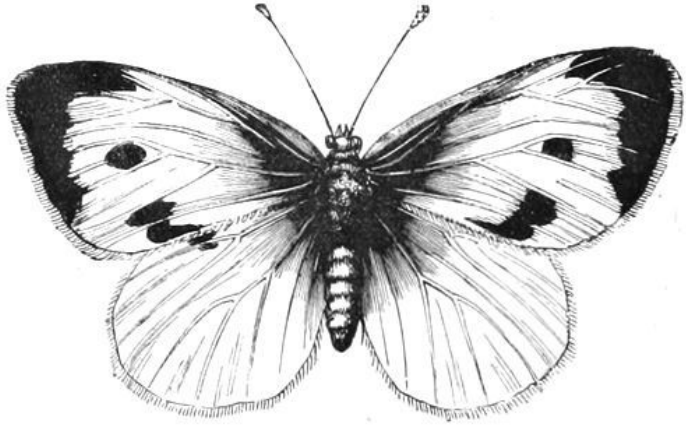


Fig. 310. Large White Cabbage Butterfly.



Fig. 311. Small White Cabbage Butterfly and Caterpillar.

The perfect male insect has the body black and wings white on the upper side, except the tips of the fore-wings, which are black and crescent-shaped; and on the upper edge of the hinder wings there is a black spot. On the under side, the fore wings are white with yellow tips, and two black patches on each; the hind wings are yellow, with small black markings.

The antennæ are alternately black and yellow, with the club black above and yellow beneath. The female (see Fig. 310) differs from the male in having two large black spots on each of the fore or upper wings, and a spot on the inner margin.

The Small White (*Pieris rapæ*, see Fig. 311) has two broods in the year, the first batch about April, and the second in July. The eggs are always placed on the upper side of the leaf, and are hatched in from ten to thirteen days, the caterpillars becoming full grown in about three weeks after emerging. The colour of the caterpillar is dark green, with a fine line of yellow, and a row of yellow spots down the sides. The chrysalis is attached by the tail and a band of silk to the place selected by the caterpillar, and varies greatly in colour, although generally it is of a whitish-brown.

Cabbage Moth (*Mamestra brassicæ*). Newman, in his "British Moths," thus describes the Cabbage Moth: "The antennæ are rather long and slender, and scarcely ciliated in either sex; the fore-wings are dark, smoky, grey brown, mottled and marbled with confused markings, both darker and paler; the orbicular spot is inconspicuous, but decidedly to be traced; the reniform stigma is delicately outlined with white or whitish-grey, and has a pale anterior disc, in which the same pale grey colour predominates; the hind wings are dark, smoky brown with rather pale base, and rather darker crescentic discoidal spot and wing-rays; the head, thorax, and body have the same colour as the fore and hind wings." The eggs are laid on Cabbages, or similar plants, and are hatched in a few days. The caterpillars are very voracious, feeding by day and night, and, what is worse, they spoil with their

excrement, in the case of Cabbages, more than they eat. They are of a dark colour, with a kind of marbling, more or less distinct, on the back, the effect being produced by a triangular mark containing two white dots on each of their segments. On being disturbed, they roll themselves into a tight ring, and so remain until they suppose that danger is over. They descend into the earth for change to smooth red-brown chrysalids, and remain there till the following spring. If the chrysalids were collected and destroyed during the autumn and winter digging, much injury would be obviated through the succeeding spring and summer.

The destruction of these pests is a very troublesome matter, as the grubs of the last-named kind bore into the heart of the cabbage. Hand-picking is the only sure method. Anything emitting a distasteful odour will also keep them at bay. Miss Ormerod recommends throwing gas-lime over the plants, but it must be previously weakened by a few months' exposure. The following remedy may also be recommended:

Paraffin, or *Coal Oil*. Mix one ounce of oil with a gallon of soapsuds, and water the plants with the mixture before the caterpillars appear. If any have appeared, an application at the rate of two ounces to the gallon will generally clear them off. Of course, this operation must not be performed less than a month previous to cutting the cabbages, on account of the smell. Soapsuds alone will also clear caterpillars from most smooth-leaved subjects if frequently applied.

CABBAGE FLY (*Anthomyia brassicæ*). Among the injurious insects which infest Cabbages, none commit greater havoc to both stem and root, than the

maggots of the Cabbage Fly. "They are whitish, cylindrical, and legless, tapering to the head, and blunt at the tail, which has short teeth on the lower margin, and two brown tubercles in the middle. When full grown, they are about ⅓in. long. They then leave the plants, and turn, in the earth, to pupæ, with a few black spots at the head, and short teeth at the tail, inside which the flies form, and emerge in about a fortnight or three weeks. The fly is of an ashen-grey colour, and smaller than the Onion Fly, which it much resembles. The male is of a darker grey, and has a short black stripe along the back between the wings, with a curved one on each side of it, and one black stripe along the abdomen" (Ormerod). The presence of these maggots may be easily detected by the flagging and change of colour of the leaves. The infested plants should be immediately removed and destroyed. The following remedy will be found beneficial:

Lime. Hot lime should be soaked in water for about twenty-four hours. When clear, the infested Cabbages should be well washed with the liquid. Superphosphate of lime may also be applied with advantage.

CABBAGE GALL WEEVIL (*Ceutorrhynchus sulcicollis*). This is a pretty little beetle, about three-quarters of a line or one line in length. Its colour is dark, but the insect is really of a coppery hue; on the thorax and head are rather large depressions; the wing-cases vary in colour from green to greenish-blue, or even black, and along the entire length of the elytra are parallel lines or holes, as may be seen with the aid of an ordinary lens. This insect, which causes much damage to plants of the *Brassica* family, is, in some places, very difficult to eradicate. It is also very

destructive to other crops, and, therefore, any effectual remedy is valuable. The following methods may be recommended:

Carbolic Acid. Mix 1oz. Calvert's No. 5 carbolic acid with two gallons of soapsuds, and add sufficient loam or clay to make a thin paste. Dip the roots of the whole of the plants into this before they are set out. Well stir the mixture, and put the plants out in a damp soil, so that watering will not be necessary.

Paraffin, or *Coal Oil.* This, applied in the same manner as recommended for Carbolic Acid, is also very good.

Guano, Superphosphate of Lime, and Nitrate of Soda. A good dressing of either of these, given after the ground is dug, and in wet weather, about a month before the plants are put out, has been found very beneficial; but, although preventatives, they do not totally clear the crop from insects for the season.

Soot and Lime. Take equal parts of air-slaked lime and soot, and mix together. Set the plants with a trowel, and, having placed some soil over the roots, throw in a little of the mixture, filling up the hole with soil.

CABBAGE MOTH. *See* **Cabbage Caterpillars.**

CABBAGE PALM. *See* **Euterpe oleracea**.

CABBAGE POWDERED-WING (*Aleyrodes brassicæ*). A small four-winged powdery fly, closely allied to the Aphides. As implied by its name, this pest infests the various sorts of Cabbages. It is more particularly prevalent in autumn. Its presence may be readily detected by the partial discoloration of the leaves attacked. The head and body between the wings are black, with yellow variegation; abdomen yellow or

rosy; wings white and mealy (whence its common name), the upper pair each having a darker spot, near the centre. Its destructive power resides in the rostrum, or sucking-tube, with which its head is furnished.

Remedies. The only effectual means of exterminating this pest is to destroy the leaves, preferably by burning. If its presence is detected early, an application of tobacco water, or diluted soft soap, may prove beneficial.

CABBAGE ROOT-EATING FLY. *See* **Root-eating Fly**.

CABBAGE-TREE. *See* **Euterpe oleracea**.

CABBAGE WEEVIL. *See* **Cabbage Gall Weevil.**

CABOMBA (the native name in Guiana). ORD. *Nymphæaceæ*. SUB. ORD. *Cabombeæ*. Small and very interesting aquatics. They thrive well in a cistern 1ft. deep, with 2in. of loam in the bottom, for the plants to root in, then filled up with water, and placed in a warm part of the greenhouse during summer, being allowed a rest in a cool part of the stove in winter. Propagation may be effected by root division.

C. aquatica (water-loving). *fl.* yellow, small; peduncles long, axillary, solitary, one-flowered. July. Submerged leaves opposite, stalked, cut into five divisions even to the petiole; segments multifid; floating leaves alternate, on long petioles, peltate, orbicular, entire. Guiana, 1823. SYN. *Nectris aquatica*.

C. caroliniana (Carolina) is somewhat similar to *C. aquatica*. It is a native of the Southern United

States.

CACALIA (from *kakalia*, a name used by Dioscorides). ORD. *Compositæ*. A genus of hardy herbaceous perennials, here treated as distinct from *Senecio*, of which genus, from a botanical point of view, it is but a section. Heads five to many-flowered; florets all tubular and perfect; scales of the involucre in a single row; receptacle naked; pappus of numerous capillary bristles. For culture, *see* **Senecio**.

C. atriplicifolia (Atriplex-leaved). *fl.-heads* white. August. *l.*, lower ones triangular-kidney shaped, or slightly cordate; the upper rhomboid, toothed. Stem terete. *h.* 3ft. to 6ft. United States of America.

C. hastata (hastate). *fl.-heads* white, nodding, racemose. Autumn. *l.* stalked, three-lobed, hastate, serrate. *h.* 1ft. Siberia, 1780.

C. reniformis (reniform). *fl.-heads* white, disposed in large corymbs. August. *l.* dilated, fan-shaped, 1ft. to 2ft. broad, repandly-toothed and angled, petiolate. Stem grooved and angled. *h.* 4ft. to 9ft. New Jersey, 1801.

C. suaveolens (sweet-scented).* *fl.-heads* white. Autumn. *l.* triangular-lanceolate, halbert-shaped, pointed, serrate; those of the stem on winged petioles. Stem grooved. *h.* 3ft. to 5ft. North America, 1752.

C. tuberosa (tuberous).* *fl.-heads* whitish. June. *l.* thick; lower ones lanceolate or oval, nearly entire, tapering into long petioles; upper ones on short margined petioles, sometimes toothed at the apex. Stem angled and grooved. *h.* 2ft. to 6ft. North America.

CACOUCIA (its name in Guiana). ORD. *Combretaceæ*. A small genus of stove twining or climbing shrubs. Flowers large, showy, racemose. Leaves opposite, oblong or ovate-elliptical. For culture, *see* **Combretum**.

C. coccinea (scarlet).* *fl.* scarlet, alternate, bracteate at the base, disposed in long terminal racemes. May. *l.* ovate, acuminated, shortly petiolate. Guiana. (A. G. i., 179.). A handsome stove climber.

CACTEÆ. A large order of succulent plants, with remarkable spines clustered on the cylindrical, angular, two-edged, or leafy stems. Flowers very variable, showy or minute, usually solitary, sessile, rarely in fascicles, ephemeral; petals disposed in two or more series, hardly distinguishable from the inner sepals, and sometimes united with them; sepals numerous, united and adnate a great length to the ovarium. Fruit fleshy, one-celled, many-seeded. Well-known genera are *Cereus*, *Melocactus*, *Mammillaria*, *Opuntia*, *Pereskia*, and *Rhipsalis*.

CACTUS (from *kaktos*, a name used by Theophrastus to describe a spiny plant). This generic term is popularly applied to all members of the extensive

family *Cacteæ*, which order may be distinguished by the following characteristics: Calyx composed of many sepals, usually indefinite in number, the inner series not readily distinguishable from the petals, united and adnate a great length to the ovary; with the tube smooth in the genera *Mammillaria*, *Melocactus*, and *Rhipsalis*; or with the lobes of the sepals crowning the fruit, and having the tube scaly, as in the genera *Cereus*, *Opuntia*, and *Pereskia*. Petals disposed in two or more series, hardly distinguishable from the inner sepals, and somewhat united to them; sometimes irregular, and disposed in a long tube at the base, but distinct at the apex, as in the genera *Mammillaria*, *Melocactus*, and *Cereus*; sometimes equal and distinct to the very base, forming a rotate corolla, as in the genera *Opuntia*, *Pereskia*, and *Rhipsalis*. Stamens indefinite, disposed in many series, more or less cohering with the petals or inner sepals; filaments slender, filiform; anthers ovate, versatile, two-celled. Ovarium obovate, fleshy, one-celled. Fruit fleshy, one-celled, many seeded, either smooth and crowned by the calyx, or covered with scales, scars, or tubercles, and umbilicate at the apex. This order contains fleshy or succulent shrubs, very variable in habit and size. Flowers very variable, showy, or minute, usually solitary, sessile, rarely in fascicles, ephemeral, expanding by night or day. Leaves usually wanting, but, when present, small, caducous, and terete, rarely flat and expanded, sometimes alternate and disposed in a spiral order, always glabrous and fleshy. Prickles or bristles disposed in fascicles, rising from the axils of the leaves. In the leafless genera, the fascicles of spines are disposed on the angles of the stem, rising from tubercles. Stems usually angular, winged, or regularly beset with tubercles, rarely terete, usually

jointed; joints compressed. A group of Cacti is shown at Fig. 312, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt, Germany. *See* **Cereus**, **Disocactus**, **Echinocactus**, **Epiphyllum**, **Leuchtenbergia**, **Mammillaria**, **Melocactus**, **Nopalea**, **Opuntia**, **Pelecyphora**, **Pereskia**, **Phyllocactus**, and **Rhipsalis**.

Cultivation. Perhaps no class of plants more easily accommodate themselves to a general system of treatment, than do these; although certain genera would undoubtedly thrive better than when subjected to the lower temperature, suited to the requirements of those coming from cooler regions. Notwithstanding that nearly all the species are natives of the western hemisphere, they occur in various geographical and altitudinal areas, in which the temperature is proportionately lessened or increased, as the case may be; yet, presuming a special house is set apart for their culture, the majority of the species may be happily suited therein. The warmest end of the structure should be selected for the tropical kinds; while those found in cooler regions may be grown in the other portions of the house; even those which are hardy in our climate are really best wintered in a house or frame. Granted that several species will endure our winter outside, it is yet necessary to give them the shelter of a friendly ledge of the rockery, or frame, or to cover them in their permanent position with a hand light, or sheet of glass, in order to prevent the ill-effects of excessive moisture. Generally, a winter temperature of from 50deg. to 55deg., and a summer one of from 70deg. to 80deg. during shade, or in sunshine up to 90deg., will be found advantageous. When thus treated, it will be necessary to keep the tropical species, on the whole, very dry during the winter. As

regards soil, potting, and general treatment, all may be treated alike, except *Epiphyllum*, *Disocactus*, and *Pereskia* (which *see*). Some growers give them the protection of a house in winter, and stand them outside during the summer, which is not, however, a very commendable plan, as, in consequence of the very variable character of our climate being especially prejudicial to several of the tender and more delicate species, the often excessive amount of moisture they would receive, will produce a weakly state of health in many, while others will be lost. It is far better if their culture is attempted at all, to give them the proper treatment. The numerous species and varieties found on the Rocky Mountains are a most interesting series, and may be well managed in a cold frame facing south, arranging them on shelves as close to the glass as possible, and keeping them very dry through the winter. If the weather is very severe, the lights should be matted. One of the best collections of these in the country, is in the possession of E. G. Loder, Esq., Floore House, Weedon, Northampton, where a great number are admirably grown in frames, and under a large ledge of the rockery outside. Amateurs may grow quantities of handsome Cacti either in dwelling rooms near the window, or in small frames or greenhouses. As they are slow growing, not much space will be occupied; at the same time, a great deal of interest will be centred in their culture. As regards watering and insect pests, they are but little trouble. Miniature Cacti, of numerous kinds, are now often sold in small pots, and most attractive little subjects they prove.



1. Opuntia.
2. Cereus.
3. Opuntia streptacantha.
4. Cereus candicans.
5. Mammillaria.
6. Cereus peruvianus monstrosus.
7. Echinocereus electracanthus.
8. Mammillaria.
9. Echinopsis formosa.

10 Echinocactus Visnaga.
11. Cereus peruvianus var.
12. Opuntia candelabriformis.
13. Cereus strictus.
14. Pilocereus senilis.
15. Cereus Tweedii.
16. Cereus chilensis.

Fig. 312. Group of Cacti.

[See larger version]

Soil, Drainage, and Potting. Good ordinary fibrous loam should form about one-half of the compost, the other half should be made up of sand, broken bricks, and lime rubbish in equal quantities; the whole to be carefully mixed together, and not used until it is moderately dry. It is absolutely necessary to ensure perfect drainage; a good "stopper" should, therefore, be placed over the hole at the bottom of the pot, and about one-third of its depth filled with draining material. The best time for potting is during February and March. Turn out the plants, and remove nearly all the old soil from the roots, taking away any dead or decaying roots which may be observable. Place some of the roughest soil next the crocks, and gradually fill the pots with the finer material, well working the same amongst the roots; finally press the soil moderately firm. Do not water for a few days after potting, but syringe every evening, especially if the weather be fine; a little extra heat may be given after potting, to excite new, healthy growth. It will not be necessary every year to repot specimens in large vessels. A good top-dressing, with an occasional dose of weak liquid manure, is all they will require for several seasons.

Watering. This must be discriminately managed, especially during the winter; for, whatever their treatment as regards temperature during that season,

they must be studiously watered, and anything like a saturated condition of the soil should be avoided. If the temperature is brisk, a little water may be given once a week, or perhaps not quite so often. If the plants are subjected to very cool treatment, water must be sparingly administered during November, December, and January; after which, they should be examined weekly, and very carefully attended to. During the summer months, when in active growth, they will not suffer if watered twice a week; and, on bright afternoons, light syringings may be advantageously given.

Propagation. Three methods are adopted, viz., by cuttings or offsets, grafting, and seeds; the former is the plan generally adopted. The cuttings or offsets should be removed with a sharp cut, and laid upon a sunny shelf until the wound is healed and roots are emitted, when they should be potted in sandy soil, and placed with the others. They will thrive freely if kept syringed. Grafting is resorted to with delicate kinds, which, from some reason or another, will not grow freely except upon the stock of a stronger species; and, by this means also, such delicate kinds can be kept from the damp soil, which frequently causes incipient decay. The stocks usually employed are those of *Cereus tortuosus*, *C. peruvianus*, &c., according to the species intended for working; they readily unite with each other. If the scion and stock are both slender, wedge-grafting should be adopted; if both are broad, it is best to make horizontal sections, placing them together and securing in proper position by tying with matting, but not too tightly, or the surface may be injured. Propagation by seeds is not often adopted, as it is a very slow method; they should be sown in very sandy soil, and placed in a semi-shady position until germination

commences, when they may be exposed, and very carefully watered.

CACTUS DAHLIA. *See* **Dahlia Juarezii**.

CADUCOUS. Falling off soon; deciduous.

CÆNOPTERIS. *See* **Asplenium**.

CÆSALPINIA. (in honour of Andreas Cæsalpinus, a celebrated Italian botanist, 1519-1603). Brasiletto. ORD. *Leguminosæ*. An ornamental genus of stove evergreen trees or shrubs, not much grown, on account of the space required and the time the species take to flower. Flowers yellow or red, produced in racemes, having a top-shaped calyx, divided at the end into five parts, the lowest larger than the others; petals five, unequal-stalked, upper one shortest; stamens ten. A mixture of loam and leaf mould suits them best. Cuttings are somewhat difficult to root, but sometimes will succeed if taken off from the mother plant in a growing state and planted in sand, with a hand glass placed over them, in heat.

C. alternifolia (alternate-leaved). *fl.* orange, clustered. *l.* alternate, very elegant, compound. Central America, 1868.

C. brasiliensis (Brazilian). Brazil Wood. *fl.* orange; racemes rather panicled. *l.* with seven to nine pairs of pinnæ, each pinna bearing about fifteen or sixteen pairs of oval-oblong, obtuse, glabrous leaflets. Brazil, 1739. Plant unarmed.

C. Sappan (Sappan). *fl.* yellow, panicled. *l.* with ten to twelve pairs

of plane, each pinna bearing ten to twelve pairs of unequal-sided, obliquely oval-oblong leaflets, which are emarginate at the apex. *h.* 40ft. Tropical Asia, 1773. This tree furnishes the Sappan-wood of commerce.

C. sepiaria (hedge). *fl.* yellow. April. *l.* compound; pinnæ with about ten pairs of pinnules. *h.* 60ft. India, 1857. SYN. *Biancea scandens*.

CÆSIOUS. Lavender-colour, bluish-grey.

CÆSPITOSE. Growing in tufts.

CAFFER BREAD. *See* **Encephalartos Caffra**.

CAFFER TEA. *See* **Helichrysum nudifolium**.

CAFTA. *See* **Catha edulis**.

CAHOUN NUTS. A name applied to the fruits of *Attalea Cohune*, which yield a valuable oil.

CAIOPHORA. *See* **Blumenbachia** and **Loasa**.

CAJAN. *See* **Cajanus.**

CAJANUS (*Catjang* is the Amboyna name). Cajan. ORD. *Leguminosæ*. A genus of erect stove evergreen shrubs, clothed with velvety pubescence. Flowers yellow, distinctly peduncled, corymbose, racemose; standard sometimes beautifully veined with red. Leaves pinnately trifoliate. A light rich soil suits these plants well. Young cuttings will root in sand, with a hand glass placed over them, in heat; but plants are usually raised from seeds, obtained from the West Indian Islands and India.

C. indicus (Indian).* Pigeon Pea. *fl.*

yellow, or purple-spotted, in axillary racemes. July. *l.* pinnately trifoliate; leaflets lanceolate. *h.* 6ft. to 10ft. India. (B. M. 6440.)

C. i. bicolor (two-coloured). *fl.* yellow. July. *h.* 4ft. India, 1800. (B. R. 31, 31.)

C. i. flavus (yellow). *fl.* yellow. July. *h.* 4ft. India, 1687.

CAJUPUT OIL and **CAJUPUT-TREE**. *See* **Melaleuca leucadendron minor**.

CAKILE (derived from the Arabic). Sea Rocket. ORD. *Cruciferæ*. A pretty hardy annual, frequently found on sea-shores. It is of easy culture in most sandy soils. Propagated by seed, sown in spring.

C. maritima (sea). *fl.* lilac, large, densely corymbose. Summer and autumn. *fr.* a succulent pod, divided, when mature, by a horizontal partition into two cells, the upper containing a single erect seed, the lower a pendulous one. *l.* oblong, deeply lobed, fleshy. Stem much branched. *h.* 1ft. Sea-shores of Europe and North America.

CALABASH NUTMEG. *See* **Monodora Myristica**.

CALABASH, SWEET. *See* **Passiflora maliformis**.

CALABASH-TREE. *See* **Crescentia Cujete**.

CALABA-TREE. *See* **Calophyllum Calaba.**

CALADENIA (from *kalos*, beautiful, and *aden*, a gland; in reference to the disk of the labellum being

finely beset with glands). ORD. *Orchideæ*. A genus of pretty greenhouse terrestrial orchids from New Zealand and Australia. They should be kept in a cool frame or greenhouse, and carefully watered, when not in a growing state. A compost of peat, loam, and sand, in equal parts, suits them well. Over thirty species are enumerated, but probably none are seen out of botanic gardens.

CALADIUM (derivation of name doubtful; probably of Indian origin). ORD. *Aroideæ*. Stove perennials, chiefly grown for the great beauty and varied hue of their leaves. Spathe hood-like, rolled round at the base; spadix, upper portion entirely covered with stamens, but ultimately becoming bare at the extreme top, provided with blunt glands or sterile stamens in the middle, and ovaries beneath; anthers shield-shaped and one-celled; ovaries numerous, two-celled, with from two to four ascending ovules in each cell. Leaves upon long petioles, more or less sagittate, ovate, and usually very richly coloured. Fruit a one or two-celled berry, with few seeds. They are all of easy culture, and grow freely in a humid atmosphere. In March, when the tubers have been kept dry or rested for some time, they may be started into growth again, in small pots, placed in a stove or pit, where a night temperature of from 60deg. to 65deg. is maintained, and syringed daily once or twice at least. As soon as indications of activity are presented, they may be shifted into 4in., 5in., or 6in. pots, or larger ones may be used if good sized specimens are required. If the tubers should be in large pots, it is best to turn them out, dividing if necessary, and placing all the crowns in small pots, from which they can be removed when root action and growth are resumed, and they require more room. Large tubers, if sound, may be divided, and

the pieces placed in pots of such sizes as it is desired to grow them in.

Soil. Turfy loam, leaf mould, turfy peat, and a little well decomposed manure, in equal parts (not broken up too fine), with a good sprinkling of sharp sand, form an excellent compost, the whole being well incorporated together. Thorough drainage must be insured, as these plants require an abundance of water. After potting, they should be placed in a stove temperature, and kept well moistened by syringing two or three times daily. If accommodated with mild bottom heat at this time, they will make much freer and more vigorous growth than if otherwise treated. Water sparingly at first, but as soon as the leaves expand, increase the supply; and, when the pots are well filled with roots, apply clear liquid manure at every other time of watering. As the season advances, the temperature and humidity of the house should be increased. During bright sunshine, Caladiums should be slightly shaded for a few hours in the middle of the day, with some thin material, just to break the fierceness of the sun's rays; but the more they are exposed to the light at other times during growth, the brighter, richer, and more beautiful will the foliage be. As soon as the plants have attained a good size, some of them should be placed in the coolest part of the house, and partially hardened off; they may then be taken to the conservatory, allowing them a situation free from currents of cold air, and giving water only when really necessary. They may remain here for some time, but care must be taken to return them to the stove before they suffer from cold.

Small neatly grown specimens make beautiful ornaments for table decoration, and their suitability

for exhibition purposes is well known, and largely taken advantage of. Towards autumn, and as the foliage begins to fade, the supply of water should be gradually lessened, until all the leaves die down; the pots should then be placed under the stage in the stove, where they can be looked to now and then, and a little water given if required. By no means allow the tubers to get dried up, as is often done; for, if so, they will frequently rot away inside; whereas, kept in a semi-moist condition, even the most delicate can be preserved. In this state, they may remain until the following season. Caladiums will not endure a very low temperature; from 55deg. to 60deg. is as low as they can be safely kept. Very few of those known as "true species" are grown, being superseded, for general decorative purposes, by the numerous hybrids which have been raised of late, principally from *C. bicolor*.



Fig. 313. Caladium Chantinii.

C. argyrites (silvery).* *l.* small, sagittate, round colour light green; centre and margins white, with many irregular white blotches scattered over the remaining portion. Para, 1858. One of the smallest and most elegant of the genus, and much esteemed for table decoration. (I. H. 1858, 185.)

C. Baraquinii (Baraquin's). *l.* from 20in. to 30in. long; centre deep red;

margin dark green. Para, 1858. (I. H. 1850, 257.)

C. bicolor (two-coloured).* *fl.*, spadix shorter than the hooded spathe, which is contracted in the middle. June. *l.* peltate-cordate, sagittate, coloured in the disk. *h.* 1ft. Brazil, 1773. (B. M. 820.)

C. Cannartii (Cannart's). *l.* green, with pale blotches; veins deep red. Para, 1863.

C. Chantinii (Chantin's).* *l.* chiefly brilliant crimson, irregularly blotched with white, and margined with dark green. Para, 1858. See Fig. 313.

C. Devosianum (Devosie's).* *l.* angular, blotched white and pink. Para, 1862.

C. esculentum (edible). Synonymous with *Colocasia esculenta*.

C. Hardii (Hardy's). *l.* red-tinged, slightly spotted with white. Para, 1862.

C. Kochii (Koch's).* *l.* spotted with white. Para, 1862.

C. Lemaireanum (Lemaire's). *l.* green, with whitish venation. Brazil, 1861. (I. H. 1862, 311.)

C. Leopoldi (Prince Leopold's).* *l.* green, marbled with red, and

blotched with pink. Para, 1864.

C. macrophyllum (large-leaved).* *l.* large, palish green, blotched with greenish-white. Para, 1862.



Fig. 314. Caladium maculatum.

C. maculatum (spotted).* *l.* oblong, acuminate, cuspidate, cordate at base, finely spotted with clear white. Plant erect, caulescent. South America, 1820. See Fig. 314.

C. marmoratum (marbled).* *l.* broad, peltate, upwards of 1ft. long, sagittate-ovate, acute or shortly acuminate, the two basal lobes being slightly divergent, dark bottle-green, variegated with greyish or silvery angular spots and blotches; petioles terete, greenish, mottled with purple. Guayaquil. SYN. *Alocasia Roezlii*. The variety *costata* differs from the type in having the midrib (or costa) marked out by a tapering band of silver grey.

C. Rougieri (Rougier's). *l.* green, with white spots; the centre pale green, with red veins. Para, 1864.

C. rubronervium (red-nerved). A synonym of *C. rubrovenium*.

C. rubrovenium (red-veined).* *l.* greyish-green in the centre, with red veins. Para, 1862. SYN. *C. rubronervium*.

C. sanguinolentum (blood-red blotched).* *l.* with a white midrib, blotched with red. Amazons, 1872.

C. Schoelleri (Schoeller's). A synonym of *C. Schomburgkii*.

C. Schomburgkii (Schomburgk's).* *l.* green, with white veins. Brazil, 1861. SYNS. *C. Schoelleri* and *Alocasia argyroneura*.

C. S. Schmitzii (Schmitz's). *l.*, centre whitish, with green network; midrib

and veins red. 1861. SYN. *Alocasia erythræa*.

C. sub-rotundum (half-round). *l.* roundish, spotted with red and white. Brazil. 1858.

C. Verschaffeltii (Verschaffelt's).* *l.* somewhat heart-shaped; ground colour brilliant green, entire surface irregularly spotted with bright red. Para.

C. Wallisii (Wallis's). *l.* dark olive green, with large irregular shaped spots and blotches of the purest white, and the veins all yellowish-white. Para, 1864.

The following descriptive list of hybrid varieties is, for the most part, a selection from Mr. Bull's catalogue, and contains all of importance:

ADOLPHE ADAMS, green leaf-ground, densely speckled with white, and rose-coloured midribs; ADOLPHE AUDRIEN,* a very attractive variety, with fine large richly-coloured foliage; AGRIPPINE DIMITRY, leaves large, with white ground, narrow green margin and veins, and pink centre; ALCIBIADE,* crimson-rayed centre, surrounded with pale green, and blotched with pure white, green margin; ALFRED BLEU, leaves rich green, with pure white spots, and flesh-coloured centre; ALFRED MAME,* carmine-red, bordered with white,

and profusely spotted with rose; ALPHAND, green, spotted with red, crimson centre; ALPHONSE KARR, rosy-carmine centre and red spots; ARISTIDE, light green, with crimson centre; AUGUSTE LEMONIER,* fine large leaves, with soft green centre, and rosy-crimson ribs and veins; AUGUSTE RIVIERE, white centre and rays upon a light green ground, with crimson spots; BARILLET,* bright rosy-crimson centre, and ribs on green ground, with broad margin of rich green; BARON DE ROTHSCHILD, rich blood-red centre, and spots, on mottled green leaf-ground; BARONNE JAMES DE ROTHSCHILD,* young leaves of a bright rose colour, the more matured foliage soft rose, with red veins; BARRAL, bright green, with a fine red centre, and large spots of rose; BEETHOVEN,* ground colour white, intersected and veined with green, centre rib delicate rose; BELLEYMEI,* fine white variegated leaves; BELLINI, mottled pale green ground, with rosy centre and spots; BLANQUÆRTI, dark green, with grey veins and white spots; BUREL, dark bluish-green, veined bright rose, marked with rosy-violet, and spotted orange-red; CHANTINII FULGENS,* rich dark metallic-green, with attractive crimson centre and white spots; CHELSONI,* bright glossy green, suffused with brilliant red, and

blotched with crimson; CLIO, ground colour deep rose, shaded white, green ribs and narrow green margin; DE CANDOLLE,* rich green, with beautiful rose-coloured spots and creamy white centre rays; DE HUMBOLDT, a fine variety, having glossy green leaves, spotted with scarlet; DEVINCK, leaves heart-shaped, delicate pink centre ribs, interspersed with white spots; DR. BOISDUVAL, centre rayed crimson, snow-white blotches on a green ground; DR. LINDLEY,* crimson centre, the green ground marked with rose blotches; DUC DE CLEVELAND, deep red centre, surrounded with pea-green, largely spotted with red; DUC DE MORNY,* deep green leaf borders, with large crimson-rayed centre; DUC DE NASSAU,* brilliant red centre and ribs, white spot on emerald green leaf borders; DUC DE RATIBOR, green ground, with red midribs marked with white spots; DUCHARTRE, leaf-ground white, flushed rose, green veins and red spots; EDOUARD ANDRE, crimson centre, and rose blotches; EDOUARD MOREAUX, mottled green ground, with lake centre; EDOUARD RODRIGUES,* deep carmine, margined with light green, and spotted with rose; E. G. HENDERSON,* green, with transparent rose spots and mottled crimson rays and centre; ELVINA,

bright green, blotched with red, grey centre and veins; EMILIE VERDIER,* leaves of a light transparent rose colour, spotted with red; ETOILE D'ARGENT,* bright green, midribs and veins creamy-white, shaded with grey; EUCHARIS, rose centre, with violet reflections, margined with bright green, very fresh and bright looking; FELICIEN DAVID,* centre of leaf dark carmine, surrounded with white and beautifully veined with red on a light green ground; GOLDEN QUEEN, leaves large, pale golden yellow, uniform in colour; GRETRY, carmine centre, with white spots on a dark green ground; HELEVY, white midribs and marked with crimson blotches, on a green ground; HEROLD,* dark carmine veins, surrounded by light green, blotched with pure white, and margined dark green; IBIS ROSE,* a magnificent variety, with beautiful rich rose-coloured foliage, extremely attractive; ISADORA LEROY, rich metallic green, with crimson-red centre rays; JULES DUPLESSIS, bright rose centre, shaded with rich red and bordered with green; JULES PUTZEYS, rich green, with crimson midrib and veins, centre mottled grey, and the whole surface blotched with red; LAINGII,* reddish-carmine centre, surrounded with yellowish-green, the whole of the leaf

sprinkled with white; LAMARTINE, deep crimson centre, with white and red spots; LA PERLE DU BRÉSIL,* exceedingly attractive, large leaves, white, delicately tinted with rose, midrib and veins dark green; LEPLAY, leaves attractively marked with white, and beautifully veined with rosy-violet; LOUISE DUPLESSIS, red rays and veins on a white ground, green margin; LUDDEMANNII,* deep crimson ribs, the leaf blotched with magenta and white, border pea green; MADAME ALFRED BLEU, deep green, with large white blotches, and broad crimson-scarlet veins; MADAME ALFRED MAME, light green, covered with large white spots, rosy-carmine centre; MADAME DE LA DEVANSAYE, leaves white, shaded rose, and veined with red and green; MADAME DOMBRAIN,* centre and ribs pale yellowish-green, shaded rose, surface covered with large white and rose spots; MADAME FRITZ KŒCHLIN,* white ground, with violet-rose ribs and green veins, a beautiful dwarf-growing variety; MADAME HEINE,* silvery white, stained and edged with pale green, distinct; MADAME HUNNEBELLE, leaves veined with light garnet colour on a white ground, and margined with green veins; MADAME JULES MÉNOREAU, fine large leaves, with white centre tinted rose, veined rich bright rose, and

margined green; MADAME LAFORGE, centre and ribs reddish-crimson, with green margin; MADAME MARJOLIN SCHEFFER,* a beautiful variety, with white foliage, charmingly veined and netted with pure rosy-lake; MADAME WILLAUME, a charming variety, with transparent leaves, of a delicate salmon-rose colour; MARQUIS DE CAUX, red centre and veins, with rose blotches on margins; MARTERSTYGINUM, crimson centre and white spots; MERCADANTE, pale copper-coloured centre and veins, bordered with green; MEYERBEER,* white leaf-ground, green veins, and red midribs; MINERVE,* silvery white midrib and rays, surrounded with greyish white, green margin, with snowy white spots; MITHRIDATE, ground colour crimson-lake, with darker ribs, and dark bronze-green margin; MONSIEUR A. HARDY, rich reddish-carmine veins on white ground, tinted with rose and spotted with green; MONSIEUR J. LINDEN,* a fine large whitish leaf, with metallic reflections, coral-rose veins, and reticulated green border; MRS. LAING,* white ground, deep rose centre and veins, green margin; MURILLO,* centre and veins metallic-red, with large crimson blotches, broad margin of lustrous bronzy-green; NAPOLEON III.,* flamed crimson centre, with forked rays,

and carmine spots on green ground; ONSLOW, deep rosy-crimson centre, with broad green margin, spotted with rose; PAILLET, crimson centre, broad green margin, splashed with crimson, and dotted with white; PAUL VERONESSE, large leaves, with pinkish-white centre, deep scarlet ribs, and broad green margin; PHILIPPE HERBERT, deep mottled crimson rays, and clear white margin, spotted with crimson; PICTUM, green blotched, and spotted with white; PRINCE ALBERT,* dark emerald green, rich crimson midrib, radiating from centre to margins, the intervening spaces spotted with white; PRINCE OF WALES,* a very handsome variety, with large golden-yellow leaves; PRINCESS ALEXANDRA,* rosy-salmon leaf, green centre rib, bordered with magenta-crimson, green margin, with light pink chain; PRINCESS OF TECK,* ground colour bright orange-yellow, the veins suffused with deep red; PRINCESS ROYAL, leaves of a golden ground, with crimson centre; PYRRHUS, centre and ribs deep crimson, pea-green margins; QUADRICOLOR, centre of leaf pale yellowish-green, ribs white, edged rosy-crimson, and margined green; RAMSAU, centre and ribs deep reddish-crimson, surface covered with white blotches, shaded red;

RAULINII, rich red centre and veins, finely spotted with white; REGALE, silvery grey centre, rosy-red ribs, spotted with vermilion-red; REINE MARIE DE PORTUGAL,* violet-rose centre, with red veins, dark maroon zone, and green border, very handsome; REINE VICTORIA,* green veins and margins, spotted or marbled with white and rich crimson; ROSSINI, large leaf, with pale centre, pink midribs, and red blotches; ROUILLARD, glossy green margin, pale green centre, midrib and rays rich violet-plum, the whole leaf spotted crimson; SANCHONIANTHON, crimson centre, deep glossy crimson ribs, and pea-green margin; SIEBOLDII, rich green, with fiery-red crimson-rayed centre, green spaces, spotted with claret red; SOUVENIR DE MADAME E. ANDRE,* large deep green leaves, marbled with pure white, veins fine rosy crimson; SPONTINI, pea-green, with white spots, and rosy-pink ribs and veins; THIBAUTII, fine large leaf, with rich crimson veins on a red ground; TRICOLOR, edges of leaves grey-green, intersected with dark green, centre red-lake, carmine midribs; TRIOMPHE DE L'EXPOSITION,* crimson centre, with red ribs, and green border; VERDI, crimson-lake centre with small green zone and apple-green margin; VESTA, greenish-white veins, surrounded

with crimson, the whole of the leaf spotted bright rose; VICOMTESSE de la ROQUE-ORDAN, red midrib, and rays bordered with white, the margin beautiful emerald green; VILLE DE MULHOUSE, a beautiful variety, with greenish-white leaves, shaded rose, and rich green centre; VIRGINALE,* clear shining white, veined with dark bluish-green, a handsome variety.

CALAIS. *See* **Microseris**.

CALAMAGROSTIS (from *calamos*, a reed, and *agrostis*, grass). ORD. *Gramineæ*. An extensive genus of grasses, for the most part hardy. Panicle more or less spreading; spikelets compressed, one-flowered; empty glumes two, sub-equal, lanceolate, pointed, keeled, awnless. They thrive in any ordinary garden soil. Seeds may be sown during autumn.

C. lanceolata (lanceolate). *fl.* purple, spreading in all directions; panicle erect, loose, much branched. July. Culms about 3ft. high, smooth, slender. Britain (moist woods and hedges). (Sy. En. B. 1724.)

C. stricta (upright). *fl.* brown, spreading in all directions; panicle erect, close. June. Culm about 2ft. high, very slender, smooth. England, &c. (bogs and marshes), but very rare. (Sy. En. B. 1725.)

CALAMANDER WOOD. *See* **Diospyros quœsita**.

CALAMINT. *See* **Calamintha**.

CALAMINTHA (from *kalos*, beautiful, and *mintha*, mint). Calamint. ORD. *Labiatæ*. A genus of hardy herbaceous plants, having the following essential characters: Calyx two-lipped; stamens diverging; upper lip of corolla nearly flat; tube straight. Rather pretty plants, with Thyme-like flowers, well suited for furnishing rock gardens. They grow in almost any garden soil. Increased by seeds, cuttings, or divisions of the roots, in spring.

C. Acinos (Acinos). Basil Thyme. *fl.* bluish-purple, variegated with white and dark purple, disposed in whorls, one on each flower-stalk. July and August. *l.* acute, serrate. Stems branched, ascending, leafy. *h.* 6in. England. Annual. SYNS. *Acinos vulgaris* and *Thymus Acinos*. (Sy. En. B. 1048.)

C. alpina (alpine). *fl.* purplish, almost sessile, four to six in a whorl, June to September. *l.* petiolate, roundish or ovate, slightly serrated. *h.* 6in. S. Europe, 1731. A freely branched, tufted plant.

C. grandiflora (large-flowered).* *fl.* purplish, 1½in. long, in loose racemes; throat much inflated. June. *l.* petiolate, ovate, acute, coarsely toothed, rounded at the base, 2in. to 3in. long. Herbaceous stems branched at the base, and decumbent. *h.* 1ft. 1596.

C. patavina (Paduan). *fl.* pale or

purplish-red, rather large. June. *l.* petiolate, ovate, acute, pubescent. *h.* 6in. to 9in. S. Europe, 1776.

CALAMPELIS. *See* **Eccremocarpus**.

CALAMUS (from *kalamos*, a reed; old Greek name used by Theophrastus). ORD. *Palmeæ*. An elegant genus of stove palms. Flowers small, usually of a rose or greenish colour, clustered upon branching spikes, each branch having a separate spathe, which is not large enough to enclose it. Fruit one-seeded, and covered with smooth, shining scales. Leaves pinnate. Stems reed-like, 1in. to 2in. in thickness. When in a young state, these palms are most effective as drawing or diningroom decorations; and, when in a more mature condition, they are excellent as stove ornaments and for exhibition purposes. They are all of slender growth, and of easy culture in a compost of equal parts loam and vegetable mould; a copious supply of water being needed to keep them in a flourishing state. Propagated by seeds. *C. Rotang*, *C. viminalis*, and several other species furnish the canes usually employed in this country for the bottoms of chairs, couches, &c.

C. accedens (yielding). *l.* long, arching, dark green, pinnate; pinnæ long, narrow, closely set; petioles with slender black spines. India. A rare, but elegant, slender-growing, miniature tree.

C. adspersus (scattered). *l.* pinnate; pinnæ 6in. to 8in. long, narrow, deep green; petioles about 6in. in length, sheathing at the base, clothed with long, slender, black

spines. Stem not much stouter than a large wheat straw. *h.* 20ft. Java, 1866.

C. asperrimus (very rough).* *l.* pinnate, 3ft. to 12ft. long; pinnæ 1ft. to 2ft. in length, 1in. in breadth, pendent, light green, upper side with two rows of hair-like spines; petioles broadly sheathing at the base, densely armed with long, stout, black spines. Java, 1877. A beautiful species, which attains a considerable size. (I. H. 275.)

C. ciliaris (fringed).* *l.* pinnate, clothed with a quantity of soft hair-like bristles; petioles sheathing at the base. Stem erect and slender. India, 1869. From the plume-like habit of the leaves, it makes a splendid plant for table decoration, as well as being a beautiful specimen for exhibition.

C. draco (dragon). *l.* 4ft. to 6ft. in length, beautifully arched, pinnate; pinnæ 12in. to 18in. long, narrow, slightly pendent, dark green; petioles sheathing at base, armed with long, flat, black spines. *h.* 20ft. to 30ft. India, 1819. A very handsome species, with a robust constitution.

C. fissus (cleft). *l.* ovate in outline, pinnate, when young bright cinnamon; leaflets pendent, dark green, bearing on the upper side a few black hair-like bristles; petioles armed with dark, stout spines.

Borneo. A very ornamental species.

C. flagellum (whip-like). *l.* 6ft. to 8ft. in length when fully grown, pinnate; pinnæ pendent, about 1ft. in length and 1in. in breadth, dark green, furnished on the upper side with two rows of long, white, hair-like spines; petioles sheathing, copiously armed with stout white spines, much swollen at the base, and tipped with black. Stem slender.

C. Hystrix (bristly). *l.* pinnate; petioles spiny. A compact-growing and very graceful species.

C. Jenkinsianus (Jenkins's). *l.* pinnate, gracefully arched, 2ft. to 6ft. long; pinnæ 6in. to 12in. long, 1in. broad, rich dark green; petioles slightly sheathing at the base, armed with long flat spines. Sikkim.

C. leptospadix (slender-spadix).* *l.* pinnate; pinnules about ⅓in. wide, and from 6in. to 12in. long, subulately acuminate; upper surface with three bristle-bearing ribs; a few smaller bristles are disposed along the midrib underneath; margins finely and regularly toothed with small ascending bristles; petiole channelled, tomentose towards the base, bearing three or four solitary needle-like spines, about 1in. long. India. A rare species, and described as one of the most graceful.

C. Lewisianus (Lewis's).* *l.* ultimately spreading, 2ft. to 6ft. long, pinnate: pinnæ equidistant, ½in. broad, and front 13in. to 15in. long: veins on the upper surface bristled, under surface smooth; margins rough, with appressed bristles; petioles white, with a broad, sheathing, blackish-brown base, densely armed with long, flat, black spines. India. A fine, but somewhat rare, species.

C. Rotang (Rotang). *l.* pinnate, from 3ft. to 4ft. in length. very gracefully arched; pinnæ 6in. to 12in. long, less than 1in. broad; upper side dark green, with two rows of hair-like spines; petioles and stems armed sparingly with stout, slightly reversed spines. Stems slender. India. When young, especially, this plant is very handsome.

C. Royleanus (Royle's).* *l.* pinnate, arching; pinnæ very numerous, narrow, pendent, deep green; petioles with few spines, dark green. North-west Himalayas.

C. spectabilis (showy).* *l.* pinnate, with a few pairs of smooth linear-lanceolate, three-ribbed leaflets, measuring 6in. to 8in. long; petioles green, furnished with numerous short conical white spines, tipped with brown. Malacca. A slender-growing species.

C. verticillaris (whorled). *l.* pinnate, with a very ornamental plume-like appearance; pinnæ long, broad, drooping; petioles with the spines arranged verticillately. Malacca. This beautiful species is extremely rare.

C. viminalis (twiggy).* *l.* 1ft. to 2ft. long, pinnate; pinnæ about 6in. long, narrow, light green; petioles sheathing, densely armed with long flat white spines. When only 3ft. or 4ft. in height, its spiny whip-like spikes of flowers are often produced. Stem slender. *h.* 50ft. Java, 1847.

The following are other, but less-known, species: *australis*, *elegans*, *micranthus*, *niger*, *oblongus*, and *tenuis*.

CALAMUS AROMATICUS. An old name of **Acorus Calamus** (which *see*).

CALAMUS ODORATUS. An old name of **Andropogon Schœnanthus** (which *see*).



Fig. 315. Calandrinia Menziesii, showing Flower and Habit.

CALANDRINIA (in honour of L. Calandrini, an Italian botanist, who lived in the beginning of the eighteenth century). Ord. *Portulaceæ*. A rather large genus of fleshy, glabrous, annual or perennial, herbaceous plants, some fourteen or fifteen species growing in Australia, the rest occurring in the New World. Flowers usually rose or purple, solitary, or in terminal umbels or racemes. Leaves quite entire, radical or alternate. Only four or five species are cultivated in this country; these are treated as half-hardy annuals—with the exception of *C. umbellata*, which is best treated as a biennial—and as such they are extensively grown in small gardens, with most satisfactory results. They should be sown in the spots where they are intended to flower, as transplantation, unless performed with more than ordinary care, will considerably check their growth

or result in loss. Their flowers only expand during bright sunshine, and, consequently, they are less grown than they otherwise would be. The plants thrive in a light sandy soil. *C. umbellata* may be sown in a pan, placed in a cold frame, in May or June; and when the plants are large enough to handle, they should be potted off, or placed out in colonies where they are to bloom.

C. discolor (two-coloured). *fl.* bright rose, with a yellow tuft of stamens in the centre, 1½in. across; raceme long. July, August. *l.* fleshy, obovate, attenuated at the base, pale green above, purple beneath. *h.* 1ft. to 1½ft. Chili, 1834. (B. M. 3357.)

C. grandiflora (large.flowered).* *fl.* rosy, about 2in. across; calyx spotted; raceme simple, loose. Summer. *l.* fleshy, rhomboid, acute, petiolate. Stem suffruticose. *h.* 1ft. Chili, 1826. (B. R. 1194.)

C. Menziesii (Menzies').* FL. deep purple-crimson, from ½in. to 1in. across, terminal and axillary, solitary. June to September. *l.* elongated, spathulate, much attenuated at the base. Stems much branched, prostrate. California, 1831. SYN. *C. speciosa*. See Fig. 315. (B. R. 1598.)

C. nitida (shining). *fl.* rose-coloured, about 2in. across; raceme leafy, many-flowered. Summer. *l.* oblong-spathulate, sub-acute, glabrous,

attenuated at the base, 1in. to 2in. in length. *h.* 6in. Chili, 1837. A very pretty hardy annual, forming a tuft from 4in. to 6in. across.

C. speciosa (showy). A synonym of *C. Menziesii*.



Fig. 316. Calandrinia umbellata, showing Flower and Habit.

C. umbellata (umbellate).* *fl.* of a dazzling magenta-crimson, about as large as a sixpence; corymb cymose, terminal, many-flowered. Summer. *l.* radical, linear, acute, pilose. *h.* 6in. Peru, 1826. A very charming half-hardy biennial. See Fig. 316. (P. M. B. 12, 271.)

Other species occasionally met with are: *compressa*, *micrantha*, and *procumbens*; they are, however, inferior to those described above.

CALANTHE (from *kalos*, beautiful, and *anthos*, a flower). ORD. *Orchideæ*. SEC. *Vandæ*. A very handsome genus of stove terrestrial orchids. They may be characterised as robust-growing plants, producing large, broad, many-ribbed, or plaited leaves, which are, with one or two exceptions, evergreen, and long spikes, bearing many flowers, distinguished by their calcarate lip, which is attached to the column, and by the eight thick, waxy pollen masses adhering to a separate gland. Calanthes should be special favourites with amateurs, as, in the first place, they produce an abundance of showy flowers, which last a long time in perfection; and, secondly, because they are so easily managed. In potting these plants, it will be necessary to depart from the usual style of potting orchids, and, instead of elevating them above the rim of the pot upon a cone of peat and sphagnum, they must be kept below the rim, as in potting ordinary plants. In place of the usual soil and moss, these plants should have a mixture of loam, leaf mould, and peat, broken up rough, to which may be added some silver sand and dried cow manure. During the growing season, they require abundant supply of water, and in winter even this element must be administered freely to the evergreen kinds; whilst the deciduous ones, on the contrary, enjoy a thorough rest after blooming. Good drainage is essential to all. Little more need be said upon the cultivation of Calanthes during the summer months. When growing, they enjoy strong heat and plenty of moisture; but, when growth is complete, a cooler situation is most beneficial. They are subject to the attacks of various insects, which must be

continually searched for, and, when found, destroyed; for, if neglected in this particular, the bold and handsome leaves will be much disfigured, and rendered far from ornamental. Propagated by suckers and divisions. About forty species are known, of which the following are a selection:

C. curculigoides (Curculigo-like). *fl.* beautiful orange-yellow, disposed in an erect spike. Summer and autumn. *l.* large, evergreen, plaited. *h.* 2ft. Malacca, 1844. (B. R. 33, 8.)

C. Dominyi (Dominy's).* *fl.*, sepals and petals lilac; lip deep purple. This fine hybrid is a cross between *C. Masuca* and *C. veratrifolia*. (B. M. 5042.)

C. furcata (forked). *fl.* creamy white, very freely produced; spikes erect, 3ft. long. June to August. Luzon Isles, 1836. An excellent exhibition plant.

C. Masuca (Masuca).* *fl.*, sepals and petals deep violet colour, with an intense violet-purple lip; numerously produced on spikes 2ft. long. June to August. India, 1838. (B. M. 4541). The variety *grandiflora* differs from the type in its greater size both of spike and individual flower; the gigantic spikes are from 3ft. to 4ft. high, and continue blooming for three months.

C. Petri (Peter Veitch's).* *fl.* whitish-yellow. Said to be very like *C.*

veratrifolia, but bearing leaves a little narrower, and a system of five curious sulcate yellowish calli on the base of the lip, without the single lamella and teeth which are proper to that species. Polynesia, 1880.

C. pleiochroma (many-coloured). *fl.* whitish, purplish, ochre, orange. Japan, 1871.

C. Regnieri (Regnier's). *fl.*, sepals and petals white; lip rosy-pink; middle lobe short, wedge-shaped, and emarginate. Pseudo-bulbs jointed, Cochin China. *fausta* is a fine variety, with the base of the tip and column a warm crimson.

C. Sieboldii (Siebold's).* *fl.* yellow, large; spikes erect. *l.* broad, dark green, plaited. *h.* 1ft. Japan, 1837. An elegant evergreen dwarf-growing species. (R. H. 1855, 20.)

C. Textori (Textor's). *fl.* cream-white, washed with violet on the petals and column, as well as on the base of lip, where the calli are brick-red, changing later on to ochre-colour, excepting the white-lilac base of sepals and petals and the column; lip very narrow. Japan, 1877.

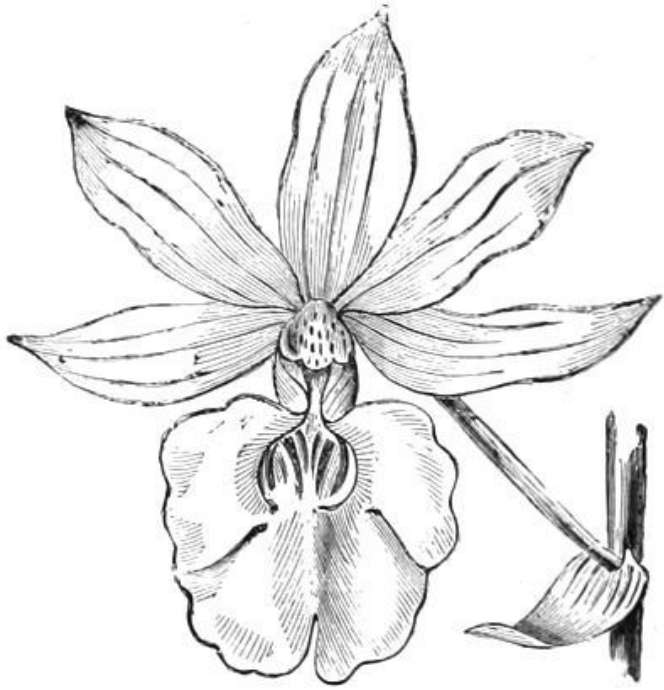


FIG. 317. SINGLE FLOWER OF CALANTHE VEITCHII.

C. Veitchii (Veitch's).* *fl.* rich bright rose, with a white throat; spikes often attaining a height of 3ft., and bearing an immense quantity of flowers. Winter. *l.* large, plaited, light green, deciduous. Pseudo-bulbs flask-shaped. This very beautiful hybrid is the result of a cross between *C. vestita* and *C. rosea* (SYN. *Limatodes rosea*). See Fig. 317. (B. M. 5375.)

C. veratrifolia (Veratrum-leaved).* *fl.* pure white, except the green tips of the sepals and the golden papillæ

on the disk of the labellum; spikes 2ft. to 3ft. high, freely produced on well-grown plants. May to July. *l.* 2ft. or more long, dark green, broad, many-ribbed, with wavy margins. India, 1819. See Fig. 318. (B. M. 2615.)



Fig. 318. Single Flower of Calanthe veratrifolia.

C. vestita (clothed).* *fl.*, sepals and petals pure white, numerously produced in a many-flowered, nodding spike. *l.* deciduous. Pseudo-bulbs large, whitish, *h.* 2½ft. Burmah. (B. M. 4671.) The varieties of this species are very numerous.

C. v. igneo-oculata (fire-eyed).* *fl.*, base of the column purplish, over which is a dazzling fire-colour, the blotch in the base of the lip of the same colour. Borneo, 1876.

C. v. nivalis (snowy).* *fl.* pure white, entirely destitute of any colour on the lip. Java, 1868.

C. v. rubro-oculata (red-eyed).* *fl.* delicate white, with a blotch of rich crimson in the centre; upwards of 2in. across; spikes long, drooping, having a white downy covering, and rising from the base of the silvery-green pseudo-bulbs, when the latter are without leaves. October to February.

C. v. Turneri (Turner's).* *fl.* pure white, with rose-coloured eye, larger, and produced on longer flower-spikes than the other kinds; form of flowers more compact. Java. This is considered by some authorities, to be a distinct species.

CALATHEA (from *kalathos*, a basket; in reference to the basket-shaped stigma, or to the leaves being worked into baskets in South America). ORD. *Scitamineæ*. This genus of very ornamental-leaved stove plants is distinguished from *Maranta* by mere botanical characters; and the two genera are often confounded. Flowers in terminal spikes, bracteate; perianth six-cleft, outer segments lanceolate, inner ones blunt and irregular; stamens three, petal-like. Leaves large, springing from the contracted stem,

near the root. They delight in a rich, loose, open soil, consisting of peat, loam, and leaf soil, in about equal proportions, with the addition of a good sprinkling of sand, to keep it open and porous. The mixture should be used in a rough, lumpy state, so that the roots, which are of large size, may be able to travel with freedom. Nearly all the species admit of easy increase by division. July is a favourable time to set about it, or it may be carried out any time between that and the spring months. In order to make the necessary separation without damaging the roots, the plants should be shaken out from the soil, when they may be divided into as many pieces as there are separate crowns. Whether an increased stock be desired or not, Calatheas require fresh soil annually; and, if not reduced by division, they become much too thickly foliaged to properly develop, unless they are shifted into larger-sized pots, which can always be done if large specimens are required. When making divisions, see that each crown is well furnished with roots, so that they may at once commence sending up fresh young foliage. Although Calatheas require an abundant supply of water while growing, a stagnant moisture is most injurious; good drainage is, therefore, essential. To have the leaves in fine, healthy condition, plenty of atmospheric moisture must be maintained during their growth; and, if syringing is resorted to for the purpose of securing this, clear soft water should be used, or an unsightly deposit will be the result, by which the beauty of the plants, unless they are frequently sponged, will be spoiled. These plants require, in addition to plenty of moisture, moderate shade during the summer, as they dislike strong sunshine, and may, therefore, be grown among ferns, under creepers, in situations that would be of little use for

other purposes. Calatheas are not subject to insects if properly supplied with water while growing, and a sufficiently moist atmosphere is at all times maintained; but, if either of these are lacking, red spider soon put in an appearance, and quickly disfigure the leaves.

C. applicata (inclined). *fl.* white. Brazil, 1875. SYN. *Maranta pinnato-picta*. (B. H. 1875, 18.)

C. arrecta (erect).* *l.* rich satin-green on the upper side, and heavy ruby colour on the under side. Ecuador, 1872. A fine species, with a very elegant growth. (I. H. 1871, 77.)

C. Bachemiana (Bachem's). *l.* silvery, with green lines and blotches. Brazil, 1875.

C. Baraquinii (Baraquin's).* *l.* ovate-lanceolate; ground colour bright green, relieved by beautiful bands of silvery white. Amazons, 1868.

C. bella (handsome).* *l.* greyish-green, with the margins and two series of central patches deep green. Brazil, 1875. SYN. *Maranta tessellata Kegeljani*.

C. crocata (saffron-coloured). *fl.* orange. Brazil, 1875.

C. eximia (choice). 1857. SYN. *Phrynium eximium*. (R. G. 686.)

C. fasciata (banded).* *l.* 8in. to 12in. long, 6in. to 8in. wide, broadly cordate; ground colour bright green, with broad bands of white running across from midrib to the margin; the under side pale green, tinged with purple. *h.* 1ft. Brazil, 1859. (R. G. 255.)

C. hieroglyphica (hieroglyphic). *l.* broadly obovate, obtuse; ground colour rich dark velvety green, which, towards the midrib, shades off into light emerald green; primary veins oblique, and the spaces between them ornamented with irregular streaks and bars of silvery white; under surface of a uniform dark vinous purple. Columbia, 1873. Dwarf and distinct. (I. H. 1873, 122.)

C. illustris (bright).* *l.* somewhat obovate; upper surface of a bright pea-green, streaked with transverse bands of a deeper green; midrib pink, with two irregular blotches of white traversing the leaves from base to point, midway between the margin and costa; under surface deep purple. Ecuador, 1866.

C. Kerchoviana (Kerchove's).* *l.* cordate, oblong, obtuse, shortly and abruptly acuminate, greyish-green, with a row of purplish blotches on each side of the midrib. *h.* 6in. Brazil, 1879. SYN. *Maranta*

leuconeura Kerchoviana.

C. Legrelliana (Le Grell's). *l.* very dark green, relieved by a feathery band of white, extending the whole length between the midrib and margin. Ecuador, 1867.

C. Leitzei (Leitze's). *l.* oblong-lanceolate, deep metallic green, and shining on the upper surface, with feather-like markings of deeper colour, purplish-violet beneath. Brazil, 1875. (R. G. 935.)

C. leopardina (leopard).* *l.* oblong, pale or yellowish-green, marked on each side of the costa with several oblong acuminate blotches of deep green. *h.* 2ft. Brazil, 1875. (R. G. 893.)

C. leuconeura (white-nerved). A synonym of *Maranta leuconeura*.

C. leucostachys (white-spiked). *h.* 1ft. A fine species, allied to *C. Warscewiczii*. Costa Rica, 1874. (B. M. 6205.)

C. Lindeni (Linden's).* *l.* oblong, 6in. to 12in. long, deep green, with blotches of yellowish-green on each side of the midrib; under surface purplish-rose, through which the markings of the upper side are visible. Peru, 1866. Very handsome and free-growing. (I. H. 1871, 82.)

C. Luciani (Lucian's). *l.* shining

green, the midrib festooned with silvery white. Tropical America, 1872.

C. Makoyana (Makoy's).* *l.* oblong, somewhat unequal-sided, 6in. to 8in. long, upwards of 4in. broad; outer margin deep green, the central portion semi-transparent, beautifully blotched with creamy-yellow and white; the central part is also ornamented between the transverse veins with oblong blotches of deep green; petioles slender, purplish-red. Tropical America, 1872. SYN. *C. olivaris*. (G. C. 1872, p. 1589.)

C. Massangeana (Massange's).* *l.* beautifully covered with rich marking, presenting a somewhat similar appearance to the wings of certain butterflies. The outer portion is olive-green; the middle, on both sides of the costa, of a delicate silvery-grey colour, from which the whitish side veins run out in a well-defined and regular manner; the portion of the leaf surrounding the silvery centre is ornamented with large blotches of dark velvety purplish-maroon, occasionally shaded with brownish-crimson; the whole of the leaf being marked with silky and sparkling reflections. Brazil, 1875. It is of neat habit, growing in close tufts, its ample foliage covering the ground.

C. medio-picta (middle painted). *l.* oblong-acute, tapering to the base, dark green, with a feathered white central stripe. Brazil, 1878.

C. micans (glittering).* *l.* oblong-acuminate, 2in. to 3in. long, a little over 1in. in breadth, dark shining green, with a white feathery stripe down the centre. Tropical America. The smallest species of the genus with a spreading habit, and quickly forming dense and beautiful tufts. There is a variety of this named *amabilis*. Brazil.

C. nitens (shining).* *l.* oblong, green, with a bright glossy surface, marked on each side of the midrib with a series of oblong acute bars, alternating with numerous lines of a dark green on a pale bright green ground. Brazil, 1880. An elegant and small-growing plant.

C. olivaris (olive-green). Synonymous with *C. Makoyana*.

C. ornata (ornamented).* *l.* oblong acuminate, 6in. to 9in. long, 3in. or more broad, yellowish-green, relieved by broad transverse bands of dark olive-green; under side tinged with purple. *h.* 1ft. to 2ft. Columbia, 1849.

C. o. albo-lineata (white-lined). Columbia, 1848. SYN. *Maranta albo-lineata*.

C. o. majestica (majestic). Rio Purus, 1866. SYN. *Maranta majestica*.

C. o. regalis (royal). Peru, 1856. SYNS. *Maranta regalis* and *M. coriifolia*.

C. o. roseo-lineata (rosy-lined).* *h.* 1ft. 1848. SYN. *Maranta roseo-lineata*.

C. pacifica (Pacific). *l.* oblong ovate, of a fine dark green on the upper surface, olive-brown beneath. Eastern Peru, 1871.



FIG. 319. CALATHEA VEITCHII.

C. pardina (leopard).* *fl.* yellow, large, handsome, produced in great abundance. *l.* 10in. to 18in. long, 5in. to 6in. wide, ovate, pale green, with dark brown blotches on each side the midrib, and which occur at regular intervals the whole length of the leaf. New Grenada. (F. d. S. ii., 1101.)

C. prasina (leek-green). *l.* with a yellow-green central band. Brazil, 1875.

C. princeps (magnificent).* *l.* 12in. to 18in. long; centre rich dark green, broadly margined with yellowish-green, purple beneath. *h.* 2ft. to 3ft. Peru, 1869. A superb large-growing species.

C. pulchella (pretty). *l.* bright green, with two series of deep green blotches, alternately large and small. Brazil, 1859. This much resembles *C. zebrina* in general appearance, but is not so strong a grower, and the leaves are not so dark.

C. rosea-picta (rose-coloured). *l.* somewhat orbicular, of a rich glossy green; midrib of a lovely rose-colour, between the margin and midrib are two irregular bands of the same colour, traversing the entire length of the leaf. Upper Amazon, 1866. (R. G. 610.)

C. Seemanni (Seemann's). *l.* about 1ft. long, 6in. broad, satiny emerald-green; midrib whitish. Nicaragua, 1872.

C. splendida (splendid). *l.* large, oblong-lanceolate, deflexed, 10in. to 18in. long, rich dark olive-green, with distinct blotches of greenish-yellow. Brazil, 1864.

C. tubispatha (tube-spathed).* *l.*

somewhat obovate, obtuse, 6in. to 12in. long, pale greenish-yellow, beautifully relieved by a row of rich brown oblong blotches, set in pairs on each side of the midrib, throughout the entire length of the leaf. West Tropical America, 1865. An elegant species. (B. M. 5542.)

C. Vanden Heckei (Van den Heck's).* *l.* rich dark glossy green, shaded with transverse bands of a lighter green; midrib broadly margined with silvery-white, two bands of the same colour traverse the leaf from base to apex, midway between midrib and margin; under side of a uniform purplish-crimson. Brazil, 1865. Very distinct and handsome.

C. Veitchii (Veitch's).* *l.* large, ovate elliptic, over 1ft. long, very rich glossy green, marked along each side the midrib with crescent-shaped blotches of yellow, softened by shades of green and white; under surface light purple. *h.* 3ft. W. Tropical America, 1865. Probably the handsomest of the genus. See Fig. 319.

C. virginalis (virginal). *l.* large, broadly ovate, light green; midrib white, also with a white band on each side; the under side of a greyish-green. Amazons, 1857. Habit dwarf and compact.

C vittata (striped). *l.* ovate-acuminate, 9in. long, very light green, with narrow transverse bars of white on each side of the midrib. Brazil, 1857.

C. Wallisii (Wallis's).* *l.* rather large, of a rich and pleasing light green, beautifully relieved with a ray of rich dark green. South America, 1867. A handsome and distinct sort, but somewhat rare.

C. W. discolor (two-coloured). *l.* bright velvety green, with the centre and margins grey. South America, 1871.

C. Warscewiczii (Warscewicz's).* *l.* 2ft. long, about 8in. wide, deep velvety green in colour, relieved by a feathery stripe of yellowish-green on either side the midrib, and extending from the base to the apex. *h.* 3ft. Tropical America, 1879. A fine sort. (R. G. 515.)

C. Wioti (Wiot's). *l.* bright green, with two series of olive-green blotches. Brazil, 1875.



FIG. 320. CALATHEA ZEBRINA.

C. zebrina (zebra).* *l.* 2ft. to 3ft. long, 6in. to 8in. wide, beautiful velvety light green on the upper side, barred with greenish-purple; under side of a dull greenish-purple. *h.* 2ft. Brazil, 1815. This is a very old inhabitant of our stoves, and, for general usefulness is not much surpassed. See Fig. 320. (B. R. 385.)

CALATHIAN VIOLET. *See* **Gentiana Pneumonanthe**.

CALCARATE. Spurred, or having a spur.

CALCEOLARIA (from *calceolus*, a little slipper, in allusion to the form of the corolla; the form *calceolarius*, shoemaker, probably chosen to include a reference to F. Calceolari, an Italian botanist of the sixteenth century). Slipperwort. ORD. *Scrophularineæ*. A genus of hardy or half-hardy shrubs, sub-shrubs or herbs. Peduncles one or many-flowered, axillary or

terminal, corymbose; corolla with a very short tube; limb bilabiate; upper lip short, truncately rounded, entire; lower lip large, concave, slipper-shaped. Leaves opposite, sometimes three in a whorl, rarely alternate.

SHRUBBY SECTION. In addition to the widely-known utility of this class for bedding purposes, they are fine decorative plants when well grown, and useful alike in conservatory or dwelling house. It will be found more convenient to grow these in a pit or frame, as in such places they are less liable to the attacks of fly, and make sturdier growth. If large plants are required, cuttings should be taken in August, placed in a cold frame facing the north, in sandy soil, and, when rooted, potted off into 3in. pots. They should then be placed in a light sunny frame, where they may remain until the middle of February. The points should then be pinched out. When the plants break, they must be shifted into 48-sized pots. If there are from four to six breaks to each plant, it will be sufficient; but, should such not be the case, the plants must be stopped again, when the requisite number will probably be obtained. Directly the roots touch the pots, the plants should be transferred to 7in. or 8in. pots, in which they will flower, and the shoots must be tied out so as to develop fully. Every effort should be exerted to keep the foliage green to the base of the plants, and they should be fumigated on the first appearance of green fly. As the flower-spikes are thrown up, weak liquid manure, applied two or three times a week, will prove beneficial. For potting, the following compost is most suitable: One-half good fibrous loam, one-eighth thoroughly rotted manure, and the remainder leaf soil, with enough sharp sand to keep the whole open. During frosty weather, of course, it will be

necessary to protect the frames with mats, and to water judiciously, to avoid damping. Those plants intended for bedding will not require to be repotted, but should be inserted, about 3in. apart, in sandy soil, in a cold frame. The tops must be taken off early in March; and from the middle of April to the middle of May, they may be planted out where they are to remain. Should frosty weather, accompanied by drying winds, ensue, the plants will require the protection of inverted flower-pots, with pieces of slate or crock placed over the holes. A good soil, abundantly enriched with rotten manure, is most desirable for them.



Fig. 321. Herbaceous Calceolaria.

Varieties. These are very numerous. The best of them are the following: Bijou, dark red, very free; Gaine's Yellow, rich deep yellow, extremely free; General Havelock, crimson-scarlet, very fine; Golden Gem, bright yellow, perhaps the best; Sparkler, crimson-gold, dwarf; Victoria, dark maroon, very attractive.

Herbaceous Section. These, like the preceding, are very useful, both for house and conservatory decoration (see Fig. 321). A packet of seed from a first-class firm will, if properly managed, produce a good percentage of excellent flowers. The seed may

be sown from June to August, when large batches are required (when only one sowing is made, July will be the best month), on pans of light, sandy soil, which should be soaked with water before sowing. Care must be taken to make the surface of the soil level, and also to sow the seed as evenly as possible. It is better not to cover with soil, but a sheet of glass should be laid over the pan, which must be placed in a shady part of the greenhouse or cold frame until the young plants show the first leaf. The glass can then be gradually removed. When large enough to handle, the seedlings must be pricked out, about 2in. asunder, in pans or boxes, and placed in a close, shaded situation. As soon as of sufficient size, they must be placed singly in 3in. pots, returned to the frame, kept close for a few days, and as near the glass as possible, to make them sturdy. When necessary, they should be shifted into 5in. pots, in which they may be kept through the winter; or the later batches may be placed in small pots. By the end of October or early in November, the plants will be strong and fit for wintering; at this stage, the best place for them is in a dry, frost-proof pit, or on an airy shelf of the greenhouse, giving them sufficient water to prevent flagging. All dead leaves must be removed. On the first appearance of green fly, the plants should be fumigated with tobacco. From the end of January onwards, in order to encourage growth, the plants should be removed into 7in. or 8in. pots, giving plenty of drainage, and a compost consisting of one-half good light fibrous loam, one-fourth thoroughly decayed sheep manure, and one-fourth leaf soil, to which must be added sufficient coarse sand to keep the whole open. After potting, the plants must be again placed in the same position, and, as they require it, plenty of room given. Careful

attention to watering is necessary, as they must not be allowed to get dry. Air must be given on all suitable occasions. The flower-stems, as they require it, should be supported with small neat sticks. About May, the plants will commence to bloom, and continue to do so for a couple of months. The best flowers should be selected, and cross-fertilised with a camel-hair pencil, in order to produce a good strain of seed for future sowing. The attention of horticulturists appears to be almost wholly confined to the innumerable hybrids raised from *amplexicaulis*, *arachnoidea*, *corymbosa*, *integrifolia*, *purpurea*, *thyrsiflora*, and a few others. Very few pure species are seen in cultivation, although most of them are well worth growing.

C. alba (white). *fl.* white; peduncles elongated, racemose, dichotomous. June. *l.* linear, remotely serrated. Plant suffruticose, clammy, and resinous. *h.* 1ft. Chili, 1844. Shrubby. (B. M. 4157.)

C. amplexicaulis (stem-clasping).* *fl.* yellow, umbellately fascicled; corymbs terminal; pedicels pilose. *l.* stem-clasping, ovate-oblong, acuminated, cordate, crenately-serrated, pilose. *h.* 1½ft. Peru, 1845. Half-hardy, herbaceous. (B. M. 4300.)

C. arachnoidea (cobwebby).* *fl.* purple; peduncles terminal, twin, elongated, dichotomous. June to September. *l.* lingulately-oblong, a little toothed, narrowing downwards into long winged petioles, which are

connate at the base; about 5in. long, wrinkled. Stem herbaceous, branched, spreading, clothed with white cobwebbed wool, as well as the leaves and other parts, except the corolla. *h.* 1ft. Chili, 1827. (B. M. 2874.)

C. bicolor (two-coloured).* *fl.* in large terminal cymes; upper lip yellow, small; lower lip large, gaping, conchiform, the front clear yellow, the back white. July to November. *l.* broadly-ovate, sub-acute, coarsely crenated, wrinkled. *h.* 2ft. to 3ft. Stem much branched, woody at the base. Peru, 1829. SYN. *C. diffusa*. (B. R. 1374.)

C. Burbidgei (Burbidge's).* *fl.* rich yellow, with large lower lip. Autumn and winter. *l.* ovate, distinctly obtusely biserrate, sub-acute, with a narrow wing running down the petiole; both surfaces downy. *h.* 2ft. to 4ft. This is a handsome hybrid between *C. Pavonii* and *C. fuchsiæfolia*, raised by F. W. Burbidge, Esq., Trinity College Botanic Gardens, Dublin, 1882.

C. chelidonioides (Chelidonium-like). *fl.* yellow. June. *h.* 1ft. Peru, 1852. Annual.

C. corymbosa (corymbose). *fl.* yellow, marked with purple dots and lines, corymbose. May to October. *l.*, radical ones ovate and cordate,

petiolate, doubly crenated, white beneath; cauline ones few, cordate, half amplexicaul. Stems herbaceous, leafless at bottom, but dichotomous and leafy at top. Plant hairy. *h.* 1ft. to 1½ft. Chili, 1822. (B. R. 723.)

C. deflexa (bending). Synonymous with *C. fuchsiæfolia*.

C. diffusa (spreading). A synonym of *C. bicolor*.

C. flexuosa (flexuose). *fl.*, corolla yellow; lower lip large, ventricose; peduncles axillary and terminal, many-flowered; pedicels umbellate. *l.* cordate, unequally and bluntly crenated, petiolate, remote. Plant shrubby, rough, beset with glandular hairs. *h.* 3ft. Peru, 1847. (B. M. 5154.)

C Fothergillii (Fothergill's).* *fl.*, upper lip of corolla yellowish; lower lip sulphur colour, having the margins spotted with red, four times the size of the upper one; peduncles scape-formed, one-flowered. May to August. *l.* spathulate, quite entire, pilose above, about 1in. long. Stem herbaceous, a little divided near the root. *h.* 3in. to 6in. Falkland Islands, 1777. (B. M. 348.)



Fig. 322. Calceolaria violacea.

C. fuchsiæfolia (Fuchsia-leaved).* *fl.* yellow, disposed in terminal panicles; upper lip nearly as large as the lower one. Spring. *l.* lanceolate, glandless. *h.* 1ft. to 2ft. Peru, 1878. This is a very handsome winter-flowering shrubby species, but it is difficult to keep the foliage in anything like good condition. Syn. *C. deflexa*. (Garden, March, 1879.)

C. Henrici (Anderson-Henry's). *fl.*

yellow, disposed in terminal corymbose cymes; both lips of corolla much inflated, so as to entirely close the mouth. *l.* rather large, elongate-lanceolate, downy beneath. *h.* 2ft. Andes of Cuenca, 1865. Shrubby evergreen. (B. M. 5772.)

C. hyssopifolia (Hyssop-leaved).* *fl.* in terminal cymes; upper lip clear yellow, about half the width of the lower, and meeting closely to it; lower lip clear canary-yellow above, nearly white beneath. May to August. *l.* sessile, linear-lanceolate, sub-acute, entire. *h.* 1ft. to 2ft. Chili. Shrubby. (B. M. 5548.)

C. integrifolia (entire-leaved). Synonymous with *C. rugosa*.

C. lobata (lobed). *fl.* yellow, disposed in erect, loosely-branched cymes; lip curiously folded on itself, and spotted on the inner surface. *l.* palmately lobed. *h.* 9in. Peru, 1877. Herbaceous species. (B. M. 6330.)

C. Pavonii (Pavon's).* *fl.* rich yellow and brown, in large terminal clusters; upper lip small; lower lip large, widely gaping. *l.* perfoliate, the petioles connected by a broad wing, running all their length; blade broadly ovate, coarsely serrate-dentate; both sides covered with soft down. *h.* 2ft. to 4ft. Herbaceous. (B. M. 4525.)

C. pinnata (pinnate). *fl.* sulphur-coloured; peduncles twin or tern, panicled. July to September. *l.* pinnate; leaflets or segments toothed, lower ones pinnatifidly toothed. *h.* 2ft. to 3ft. Peru, 1773. Annual, clothed with clammy hairs. (B. M. 41.)

C. pisacomensis (Pisacomanese). *fl.* rich orange-red, large; lower lip of corolla so bent upwards as to close the mouth; cymes produced from all the upper axils, forming long leafy panicles. *l.* ovate, obtuse, coarsely crenate. *h.* 3ft. Peru, 1868. A sub-shrubby perennial, of strong, erect habit.

C. plantaginea (Plantain-like).* *fl.* yellow; lower lip of corolla large, hemispherical; upper one small, bifid; scapes generally two to three-flowered, pilose. August. *l.* radical, ovate, rhomboid, rosulate, serrated. Plant herbaceous, stemless, pubescent. *h.* 1ft. Chili, 1826. (B. M. 2805.)

C. purpurea (purple). *fl.*, corolla of an uniform reddish-violet, rather small; corymbs terminal, many-flowered. July to September. *l.* wrinkled, hispid; radical ones cuneate-spathulate, serrated, quite entire behind, petiolate, acutish; cauline ones cordate, decussate, with a few long scattered hairs on their

surfaces. Stems herbaceous, many from the same root. *h.* 1ft. Chili, 1826. There are several hybrids between this and other species. (B. M. 2775.)

C. rugosa (wrinkled). *fl.* yellow; panicles terminal, corymbose, pedunculate. August. *l.* ovate-lanceolate, or lanceolate, denticulated, wrinkled, opaque, rusty beneath; petioles winged, connate. *h.* 1ft. to 1½ft. Chili, 1822. Shrubby species. SYN. *C. integrifolia*. (B. R. 744.) Two varieties of this are *angustifolia*, and *viscosissima*.

C. scabiosæfolia (Scabious-leaved).* *fl.*, corolla pale yellow; lower lip large, ventricose; peduncles terminal, corymbose. May to October. *l.*, lower ones pinnate; superior ones pinnatifid, three-lobed, or simple, the terminal segment always the largest. Plant rather hairy. Peru, 1822. Evergreen trailer. (B. M. 2405.)

C. tenella (small). *fl.* golden yellow, with orange-red spots within the lower lip; corymbs few-flowered. *l.* opposite, ovate, acuminated. *h.* 6in. Chili, 1873. Hardy, herbaceous. (B. M. 6231.)

C. thyrsiflora (thyrse-flowered). *fl.* yellow, downy inside; thyrse terminal, crowded; peduncles compound, umbellate. June. *l.*

linear, attenuated at both ends, serrate-toothed, sessile, 2in. long, and two lines broad. *h.* 1ft. to 2ft. Chili, 1827. Shrubby, clammy. (B. M. 2915.)

C. violacea (violet).* *fl.*, corolla pale violet, spotted with deeper violet beneath; lip spreading in a campanulate manner; peduncles terminal by threes, corymbose; pedicels one to two-flowered. June. *l.* petiolate, ovate-lanceolate, coarsely serrated, white beneath. *h.* 2ft. Chili, 1853. Shrubby. (B. M. 4929.) See Fig. 322.

CALCEOLATE. Shaped like a slipper or round-toed shoe.

CALDASIA. *See* **Galipea heterophylla**.

CALDCLUVIA (named after Alexander Caldcleugh, F.R.S. and F.L.S., who collected and sent to this country many plants from Chili). ORD. *Saxifrageæ*. A greenhouse evergreen tree. Flowers panicled, terminal. Leaves opposite, simple, serrate, glabrous; pedicels jointless; stipules twin, sub-falcate, toothed, caducous. It thrives well in a compost of peat and loam, and may be propagated by cuttings of the half-ripened shoots, planted in sand, under a hand glass, and placed in a very gentle bottom heat.

C. paniculata (panicled). *fl.* white. June. Chili, 1831.

CALEA (from *kalos*, beautiful; referring to the flowers). ORD. *Compositæ*. A genus of stove evergreen

herbs or small shrubs. Pappus hairy; receptacle paleaceous; involucre imbricated. They thrive in a compost of peat and loam. Side shoots root readily, if placed in sand, under glass, and with bottom heat; seeds may be sown in March. Warmer parts of New World.

CALEANA (named after G. Caley, Superintendent of the Botanical Garden, St. Vincent). ORD. *Orchideæ*. A genus of greenhouse terrestrial orchids, natives of Australia. Flowers few, greenish-brown; column broad, thin, concave; sepals and petals narrow, reflexed; lip posticous, peltate, unguiculate, highly irritable. In fine weather, or if left undisturbed, this lip bends back, leaving the column uncovered; but in wet weather, or if the plant is shaken, the lip falls over the column, securely fastening it. Leaves solitary, radical. They are of easy culture, in a compost of fibry peat, lumpy loam, and a little charcoal.

B. major (greater). *fl.* green-brown. June. 1810.

C. minor (less). *fl.* green-brown. June. 1822.

C. nigrita (blackish-flowered). *fl.* dark.

CALECTASIA (from *kalos*, beautiful, and *ektasis*, extension; in allusion to the star-like perianth segments). ORD. *Juncaceæ*. An elegant greenhouse suffruticose perennial, with dry, permanent, starry flowers. It thrives best in a compost of peat and loam. Propagated by divisions.

C. cyanea (blue). *fl.* bright blue,

solitary, on short terminal branches. June. *l.* needle-shaped, sheathing at the base. Australia, 1840. (B. M. 3834.)

CALENDULA (from *calendæ*, the first day of the month; in allusion to the almost perpetual flowering). Marigold. ORD. *Compositæ*. A genus of showy greenhouse and hardy annuals, and some few greenhouse shrubby species. Pappus none; receptacle naked; involucre of one or two series of sub-equal, acuminate, generally scarious-edged bracts. The shrubby species are propagated by cuttings, and thrive best in a compost of loam and peat.. For culture of the annuals, *see* **Marigold**.



Fig. 323. Flowers of Calendula officinalis.

C. arvensis (field). *fl.-heads* yellow. Pericarps urceolate, obovate, smooth; outer lanceolate-subulate, muricated at back. *h.* 2ft. Europe, 1597. Hardy annual.

C. maderensis (Madeira).* *fl.-heads* orange. Pericarps cymbiform, incurved, muricated; outer five ovate-lanceolate, membranous, toothed at edge. *h.* 2ft. Madeira, 1795. Hardy. Syn. *C. stellata*.

C. officinalis (officinal).* Common Marigold. *fl.-heads* orange. June to September. Pericarps cymbiform, all incurved, muricated. *h.* 3ft. South Europe, 1573. Hardy annual. See Fig. 323.

C. o. prolifera (proliferous). A garden form, analogous to the Hen and Chickens Daisy. See Fig. 324.

C. stellata (stellate). A synonym of *C. maderensis*.



Fig. 324. Flower of Calendula officinalis prolifera.

CALICO BUSH. *See* **Kalmia latifolia**.

CALIFORNIAN EVERGREEN REDWOOD. *See*

Sequoia sempervirens.

CALIFORNIAN MAYBUSH. *See* **Photinia arbutifolia**.

CALIFORNIAN PEPPER-TREE. *See* **Schinus Molle**.

CALIFORNIAN POPPY. *See* **Platystemon californicus**.

CALIPHRURIA (from *kalos*, beautiful, and *phroura*, prison; from the handsome spathe inclosing the flowers). ORD. *Amaryllideæ*. Pretty half-hardy greenhouse bulbs. Tube of perianth narrow, funnel-shaped, nearly straight; limb regular, stellate; stamens furnished with a bristle on each side. They thrive best in a compost of sandy loam, a little peat, leaf soil, and sand. Propagated by offsets. After flowering, the plants should have a slight heat; and, when starting into new growth, should be repotted.

C. Hartwegiana (Hartweg's).* *fl.* greenish-white; umbels seven-flowered; scape nearly terete, glaucous. May. *l.* petiolate, depressed, ovate, sub-plicate, green. *h.* 1ft. New Grenada, 1843. (B. M. 6259.)

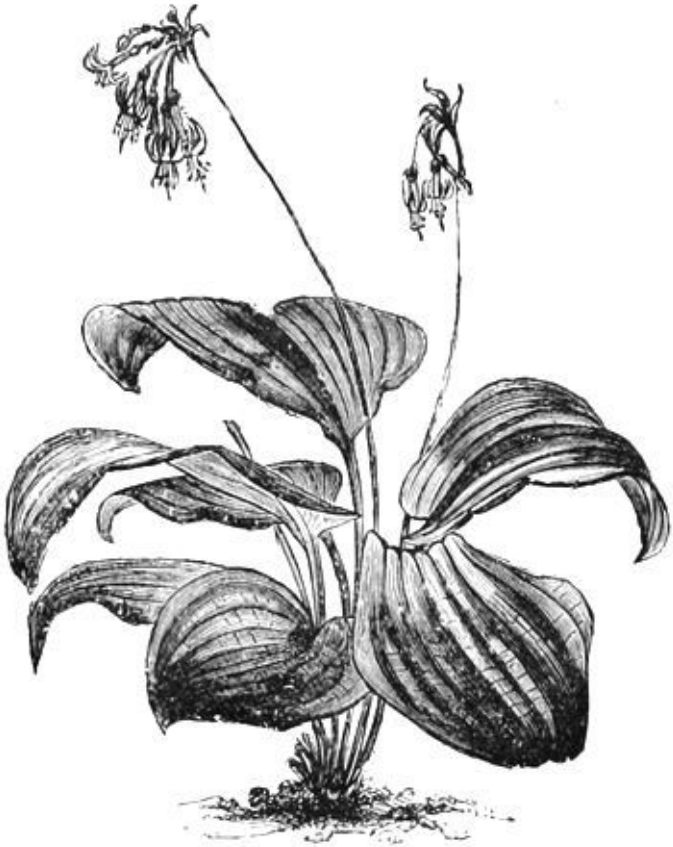


FIG. 325. CALIPHRURIA SUBEDENTATA.

C. subedentata (rarely-toothed).* *fl.* white, funnel-shaped, disposed in a truss, on a long scape. Winter. *l.* stalked, ovate-oblong. *h.* 1½ft. Columbia, 1876. See Fig. 325. (B. M. 6289.)

CALISAYA BARK. *See* **Cinchona Calisaya**.



FIG. 326. CALLA PALUSTRIS, showing Habit and detached Inflorescence.

CALLA (from *kallos*, beauty). SYN. *Provenzalia*. ORD. *Aroideæ* (*Araceæ*). A monotypic genus. The species is a native of Central and Northern Europe and North America, has creeping or floating stems, and cordate entire leaves. *C. palustris* is sometimes grown in collections of aquatics or bog plants; and, although, perhaps, hardly worth cultivating as a pot plant, is well worth a place in open ornamental waters. *Richardia æthiopica* is frequently erroneously called *Calla æthiopica*.

> **C. palustris** (marsh). *fl.*, spadix protected by a flat white spathe, upper ones female, lower hermaphrodite, with numerous thread-like stamens. *l.* stalked, emerging from a sheath. *h.* 6in. Hardy aquatic, naturalised here and there in Britain. See Fig. 326.

CALLI. Small callosities, or little protuberances.

CALLIANDRA (from *kallos*, beauty, and *andros*, a stamen; referring to the elegant long, silky, purple or white stamens). ORD. *Leguminosæ*. A genus of beautiful stove evergreen shrubs. Flowers usually borne on stalked globose heads; corollas small,

hidden by the numerous filaments of the stamens. Leaves bipinnate; leaflets varying in size and number. They thrive in a compost of peat and loam. Propagated by cuttings of rather firm young wood, inserted in sand, under a hand glass, in heat.

C. Harrisii (Harris's). *fl.* pink; peduncles axillary, fascicled, glandularly downy. February. *l.* bipinnate; leaflets obovate, falcate, downy; stipules small, falcate. Branches puberulous. *h.* 10ft. Mexico, 1838. (B. M. 4238.)

C. Tweediei (Tweedie's).* *fl.* red; peduncles longer than the petioles; bracts linear. March and April. *l.* with three or four pairs of pinnæ; leaflets numerous, oblong-linear, acutish, ciliated, pilose beneath; stipules ovate, acuminate. Branches and petioles pilose. *h.* 6ft. Brazil, 1840. (B. M. 4188.)

CALLICARPA (from *kallos*, beauty, and *karpos*, fruit; referring to the beautiful berries). SYN. *Porphyra*. ORD. *Verbenaceæ*. A genus of stove, greenhouse, or nearly hardy evergreen shrubs, closely allied to *Petræa*. Flowers inconspicuous, disposed in axillary cymes; corolla-tube short, with the limb four-lobed. Fruit a very ornamental small juicy berry or drupe. The following mode of culture has been recommended: "After the old plants have been cut back in the spring, and started into growth, the young shoots will strike as readily as a Fuchsia, and with exactly the same treatment. In order to make good plants, short-jointed cuttings should be

selected; and, as soon as these are struck, they should be potted into 2½in. pots, using a compost of equal parts loam and peat, with a little charcoal and river sand. When they commence to grow, after being potted, remove to a pit or house with a temperature ranging from 60deg. to 75deg. Pinch out the tops of the plants as soon as they have three pairs of leaves, and whenever each of the laterals has made two pairs of leaves, pinch out their points, and continue this operation with all the rest of the shoots till the beginning of August, at the same time keeping off all the flower-buds. The next shift will be into 4in. or 5in. pots. They should always have plenty of light and air, but more especially after they come into flower."

C. americana (American). *fl.* red, small, in axillary cymes. Berries violet-coloured. *l.* ovate-oblong, toothed, silvery beneath, with a scurf of tomentum. *h.* 6ft. South America, 1724. Greenhouse.

C. japonica (Japanese). *fl.* pink. August. *l.* stalked, ovate, oblong, acuminate, serrate. *h.* 3ft. Japan, 1850. Stove. (L. & P. F. G. ii., p. 165.)

C. lanata (woolly). *fl.* purplish. June. Berries purple. *l.* sessile, ovate, acuminate, serrate, hairy beneath. *h.* 3ft. India, 1788. Stove. (S. F. d. J. 1861, p. 96.)

C. purpurea (purple). *fl.* insignificant, borne in cymose clusters, upon axillary footstalks.

Berries very numerous, bright glossy deep violet coloured. *l.* opposite, ovate, acuminate; edges serrated; profusely clothed, as well as the stem, with hairs. *h.* 3ft. India, 1822. Stove. (Garden, June, 1833.)

C. rubella (reddish). *fl.* red. May. *l.* sessile, obovate, acuminate, cordate at the base, hairy on both surfaces. *h.* 2ft. China, 1822. Half-hardy. (B. R. 883.)

CALLICHROA (from *kallos*, beauty, and *chroa*, colour; referring to the bright yellow colour of the flowers). ORD. *Compositæ*. This genus is now usually included under *Layia*. Hardy annual, of easy culture in common garden soil. Seeds may be sown in March, on a slight hotbed, and transplanted to the open border early in May; or if sown out of doors in April, it will flower in the autumn.

C. platyglossa (broad-tongued). *fl.-heads* yellow, solitary, pedunculate; ray florets large, cuneate. Autumn. *l.* alternate, sessile, ciliated. *h.* 1ft. California, 1836. SYN. *Layia platyglossa*. (B. M. 3719.)

CALLICOMA (from *kallos*, beauty, and *kome*, hair; in reference to the tufted heads of flowers). ORD. *Saxifrageæ*. A greenhouse evergreen shrub. Flowers capitate; heads terminating the tops of the branchlets, pedunculate, globose. Leaves simple, coarsely serrated, stalked. Stipules membranous, bidentate, caducous. It thrives well in a sandy peat soil. Half ripened cuttings will root if placed in the

same sort of soil, under a hand glass.

C. serratifolia (saw-leaved). Black Wattle. *fl.* yellow. May to August. *l.* lanceolate, acuminate, hoary beneath, attenuated at the base. *h.* 4ft. New South Wales, 1793. (B. M. 1811.)

CALLIGONUM (from *kallos*, beauty, and *gonu*, a knee-joint; in reference to its leafless joint). ORD. *Polygonaceæ*. SYNS. *Pallasia*, *Pterococcus*. A genus containing about a score species of very curious, erect, evergreen, hardy shrubs, found growing in dry, arid, sandy spots in Northern Africa and Western Asia. They will thrive in any well-drained sandy loam. Cuttings will root in spring or autumn if placed under a hand glass.

C. Pallasia (Pallas's). *fl.* whitish, in groups. May. *fr.* winged; wings membranous, curled and toothed, succulent, acid, edible. *l.* simple, alternate, exstipulate, deciduous, caducous, minute. Shoots rush-like, smooth, green. *h.* 3ft. to 4ft. Caspian Sea, 1780.

CALLIOPSIS. *See* **Coreopsis**.

CALLIPRORA (from *kallos*, beauty, and *prora*, a front; referring to the front view of the flower). ORD. *Liliaceæ*. A very pretty little bulbous plant, now often referred to *Brodiæa*. It thrives in a well-drained spot on the lower flanks of rockwork, in dry, rich, sandy soil. Propagated by offsets, which should remain on the parent bulbs until they are a good size.

C. lutea (yellow).* Pretty Face. *fl.*, segments purplish-brown in the middle on the outside. Summer. *l.* linear-lanceolate, acuminated, channelled, longer than the flower-stem; bracts sheathing, scarious, much shorter than the pedicels. *h.* 9in. North California, 1831. SYNS. *Brodiæa ixioides*, *Milla ixioides*. (B. M. 3588.)

CALLIPSYCHE (from *kallos*, beauty, and *psyche*, a butterfly; alluding to the handsome flowers). ORD. *Amaryllidaceæ*. Ornamental greenhouse bulbs; requiring shade, and a compost of rich sandy loam and leaf mould, with good drainage. Propagated by seeds and offsets. They should have plenty of water when growing, and, during the winter, be kept moderately dry, but not dried off, so as to cause them to shrivel. As the leaves wither, water should be gradually withheld.

C. aurantiaca (orange).* *fl.* deep golden-yellow, several in an umbel, spreading, much flattened sideways; stamens green, twice the length of the perianth; scape erect, nearly 2ft. high. *l.* few, oblong-acute, bright green, conspicuously veined, stalked, 6in. long. Andes of Ecuador, 1868. (Ref. B. 167.)

C. eucrosiodes (Eucrosia-like).* *fl.* scarlet and green; stamens very long, incurved; scape about ten-flowered, glaucous. March. *l.* few, green, tessellated, pitted, 4in. wide. *h.* 2ft.

Mexico, 1843. (B. R. 1845, 45.)

C. mirabilis (wonderful)*, *fl.* greenish-yellow, small, with stamens three times as long as the perianth, and spreading out on all sides; disposed in an umbellate head of about thirty blooms; scape 3ft. high. *l.* about two, oblong-spathulate, green, 1ft. long. Peru, 1868. An extremely curious plant. (Ref. B. 168.)

CALLIPTERIS (from *kallos*, beauty, and *pteris*, a fern). ORD. *Filices*. A genus of stove ferns, founded upon the sub-genus *Diplazium*, which is now included under *Asplenium*.

CALLIRHOE (of mythological origin, from Callirhoe, a daughter of the river-god Achelous). Poppy-Mallow. Allied to *Malva*. Species belonging to this genus have been erroneously referred to *Malva* and *Nuttallia*. ORD. *Malvaceæ*. A genus of elegant annual or perennial herbs, natives of North America. They are of extremely easy cultivation, thriving in a compost of light, rich, sandy loam. Propagation of the perennial species may be effected by means of both seeds and cuttings; of the annuals, by seeds only. Seeds should be sown in spring, either outside, or in pans in a cold frame. Young cuttings should be taken and dibbled in sandy soil in a frame.

C. digitata (fingered).* *fl.* reddish-purple; peduncles long, axillary, one-flowered. Summer. *l.* sub-peltate, six to seven-parted, with linear-entire or two-parted segments; upper ones more simple. *h.* 2ft. to 3ft. 1824.

Perennial. (S. B. F. G. 129, under the name of *Nuttallia digitata*.)

C. involucrata (involucrate).* *fl.* crimson, nearly 2in. across, loosely panicled. Summer. *l.* divided nearly to the base, three to five-parted; segments narrow, lanceolate, three to five-toothed, hairy on both surfaces. Habit procumbent; stems hairy. *h.* 6in. Perennial. (G. W. P. A. 26.) SYN. *Malva involucrata* (B. M. 4681).

C. Papaver (Poppy-like).* *fl.* violet-red; sepals ovate-acute, ciliated. Summer. *l.*, root leaves lobed or pedate; lower stem leaves palmato-pedate, upper digitate or simple. *h.* 3ft. Louisiana, 1833. Perennial. SYN. *Nuttallia Papaver*. (B. M. 3287.)

C. pedata (pedate-leaved). *fl.* cherry-red, panicled. August. *l.* laciniately-pedate; upper ones trifid. *h.* 2ft. to 3ft. 1824. Annual. (R. H. 1857, 148.)

C. triangulata (triangular-leaved). *fl.* pale purple. August. 1836. Perennial. SYN. *Nuttallia cordata* (under which name it is figured in B. R. 1938).

CALLISTACHYS. *See* **Oxylobium**.

CALLISTEMMA. *See* **Callistephus**.

CALLISTEMON (from *kallos*, beauty, and *stemon*, a stamen; in most of the species, the stamens are of a

beautiful scarlet colour). ORD. *Myrtaceæ*. Handsome greenhouse evergreen shrubs or trees, having the inflorescence rising from the old branches in crowded spikes, as in the species of *Melaleuca*, but with the stamens free, as in *Metrosideros*. Leaves elongated, stiff, alternate, usually lanceolate. All the species of this genus are very ornamental and neat in habit. They are well adapted for a conservatory. The soil best suited for them is a mixture of loam, peat, and sand. Ripened cuttings strike root in sand, under a hand glass; seeds are frequently produced on large plants, and these may also be used to increase the stock, but they do not produce flowering plants for a considerable time; whereas plants raised from cuttings, taken from flowering plants, come into flower when small.

C. linearis (linear-leaved).* *fl.* scarlet; calyces clothed with velvety pubescence. June. *l.* linear, stiff, acute, keeled beneath, channelled above, villous when young. *h.* 4ft. to 6ft. New South Wales, 1788.

C. lophanthus (crest-flowered). Synonymous with *C. salignus*.

C. salignus (willow). *fl.* straw-coloured, distinct, spicate, nearly terminal; petals rather pubescent, ciliated; calyx pilose. June to August. *l.* lanceolate, attenuated at both ends, mucronate, one-nerved, villous when young, as well as the branches. *h.* 4ft. to 6ft. Australia, 1806. SYN. *C. lophanthus*. (L. B. C. 1302.)

C. speciosus (showy).* *fl.* scarlet; calyx villous. March to July. *l.* lanceolate, mucronate, flat, middle nerve rather prominent; when young, rather silky from adpressed villi, and reddish. *h.* 5ft. to 10ft. West Australia, 1823. SYN. *Metrosideros speciosa*. See Fig. 327. (B. M. 1761.)



FIG. 327. CALLISTEMON

SPECIOSUS.

CALLISTEPHUS (from *kallistos*, most beautiful, and *stephos*, a crown; in allusion to the appendages on the ripe fruit). China Aster. SYN. *Callistemma*. ORD. *Compositæ*. A hardy annual, requiring an open situation and a rich loamy soil. Involucre of many fringed bracts; receptacle naked, pitted; pappus double. Propagated by seed, sown in a hotbed in March, the seedlings being hardened off and transplanted in May. For culture of these much grown plants and their varieties, *see* **Aster.**



Chrysanthemum-flowered Aster.
Truffaut's Pæony-flowered Aster.
Victoria Aster.

FIG. 328. FLOWER-HEADS OF CALLISTEPHUS CHIN

C. chinensis (Chinese).* *fl-heads* dark purple. July. *l.* ovate, coarsely toothed, stalked; stem ones sessile,

cuneate at the base. Stem hispid. Branches with single heads. *h.* 2ft. China, 1731. See Fig. 328.

CALLITRIS (probably altered from *kallistos*, most beautiful; referring to the whole plant). ORD. *Coniferæ*. SYN. *Frenela*. Half-hardy evergreen shrubs or small trees, with long, very slender-jointed branches, and often very minute, scale-like, persistent leaves. Flowers monœcious. Fruit globular, composed of four to six—rarely eight—unequal, woody, valvate scales, with one or two seeds at the base of each. All the species are somewhat tender, in England, except in the more southern districts. They require a sandy loam compost. Propagated by cuttings, inserted under a handlight in autumn, and protected by a cold pit; or by seeds.

C. quadrivalvis (four valved). Arar-tree; Sandarach Gum-tree. *fl.*, female catkin tetragonal, with four oval valves, each furnished with a point, and two of which bear seeds. February to May. *l.* flattened, articulate. *h.* 15ft. to 20ft. Barbary, 1815.

CALLIXENE. *See* **Luzuriaga**.

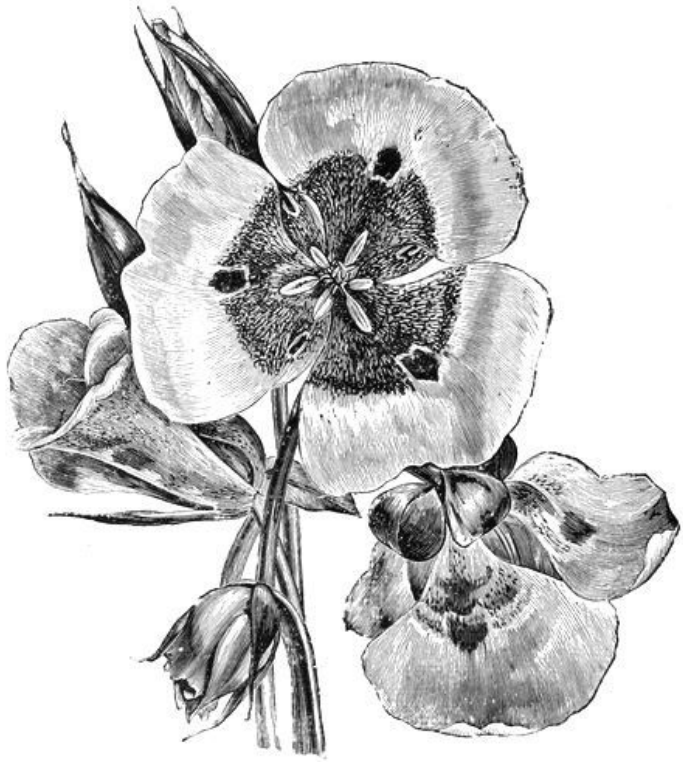


Fig. 329. Flowers and Leaves of Calochortus venustus.

CALLOSE. Callous, hardened.

CALLOUSLY-GLANDULAR. Having hardened glands.

CALLOUSLY-SERRATED. Having hardened serratures.

CALLUNA (from *kalluno*, to sweep, from the use of the plant in brooms). Common Ling; Heather. Ord. *Ericaceæ*. A small hardy spreading shrub, very common throughout Northern and Central Europe. Corolla campanulate, four-lobed, shorter than the calyx. For culture, *see* **Erica**.

C. vulgaris (common).* *fl.* disposed

in long, terminal, spicate racemes. July to September. *l.* trigonal, obtuse, very short, imbricating in four rows, having the margins revolute and the base sagittate. *h.* 1ft. to 3ft. Britain. There are numerous very ornamental varieties of this species, which are admirably adapted for planting in borders and clumps. The white-flowered (*alba*, *Serlii*, and *Hammondi*), flesh-coloured (*carnea*), and double-flowered varieties (*fl.-pl.*) are all well worth growing in shrubberies; *aurea* and *argentea*, with gold and silver coloured shoots, are also very ornamental. The value of the common form can scarcely be over-estimated for planting on barren hill sides or spaces; it affords excellent shelter for game, and food for bees.

CALLUS. The new formation at the end of a cutting before it puts forth roots; when the Callus is formed, it shows that the cutting is in a healthy state.

CALOCHILUS (from *kalos*, beautiful, and *cheilos*, a lip; referring to the beauty of the labellum or lip). ORD. *Orchideæ*. Interesting greenhouse terrestrial tuberous-rooted orchids, allied to *Epipactis*. Sepals yellowish-green; lip purple, covered with rich brown hairs. For culture, *see* **Bletia.**

C. campestris (field). *fl.* greenish and brown. April to June. *l.* narrow, oblong, pointed. Stem leafy, slender, terete. *h.* 9in. Australia, 1824. (B. M.

3187.)

C. paludosus (marsh).* *fl.* very similar in colour to those of *C. campestris*, but rather larger. May and June. *l.* rather broader. *h.* 9in. Australia, 1823. (F. A. O., part 4.)

CALOCHORTUS (from *kalos*, beautiful, and *chortos*, grass; referring to the leaves). Mariposa Lily. ORD. *Liliaceæ*. Handsome bulbous plants. Flowers showy, on erect scapes; perianth deciduous; three outer segments sepaloid, three inner ones much larger and broader, and bearded on the inside. Leaves ensiform. Bulbs tunicated. These have not, hitherto, been generally grown in the open air with much success; but in warm localities and sheltered positions, they may be flowered outside. A frame, in a sunny situation, is the best possible place for their cultivation. Here they may be fully exposed to the sun and air, during mild weather, through the winter; and, when expedient, they may be protected from excessive moisture, as that is the primary cause of failure, rather than cold, for they are perfectly hardy, and capable of enduring all the frost we are likely to get. From May onwards, the lights might be wholly removed. From the end of June to August, the bulbs will be in bloom, when, if necessary, the flowers should be fertilised to secure seed; and when the capsules are forming, material assistance would be given by placing the lights on again, allowing plenty of air. Assuming that fresh bulbs are being planted, they should be in the soil early in the autumn, as nothing is more prejudicial than keeping them dry through the winter. A good depth of soil should be provided, composed of fibrous loam, leaf soil, and sand, in equal proportions, in a well-drained

position. The bulbs must be planted 3in. deep, and some sand placed about them; they may be left undisturbed for years. Of course, where no frame can be provided, they may be planted in a well-drained, sunny position in the same soil. They are also easily managed in pots, but it is necessary to pot in the autumn, and keep in a frame. Through the winter, they must never be allowed to get dry, until the leaves are withering in the autumn, when water may be withheld.

Propagation. This may be effected by seeds or offsets, and by the tiny bulbs frequently produced on the upper portion of the stem. Sow seeds in pans, in a cool house or frame, as soon as ripe, or in the early part of the year, and keep the plants close to the glass during their early stages, as they are very liable to damp off. Sow thinly, so as to enable the young plants to pass a second season in the seed pots or pans. Early in the third season, pot off and plant out singly, encouraging them to grow freely. Propagation by offsets is the most usual method. With liberal treatment, most of the species increase pretty freely. The offsets are best removed when the plants are in a dormant state. They may be either grown in pots or pans, or planted out in pits or frames, until they reach flowering size. During the season of rest, it is the safest plan, with those in pots, to keep them in the earth in which they were grown.

C. albus (white).* *fl.* snow-white, with a rich blotch, bearded and ciliated, large, globose, pendent; umbels many-flowered, on stems from 1ft. to 1½ft. high. California, 1832. This handsome species is rare. SYN. *Cyclobothra alba*. (B. R. 1661.)

C. Benthami (Bentham's).* *fl.* rich yellow; petals obtuse, densely covered with yellow hairs; stem three to six-flowered. July, August. *l.* linear, much elongated. *h.* 4in. to 8in. Sierra Nevada. SYN. *C. elègans lutea*.

C. cœruleus (bluish).* *fl.* lilac, more or less lined and dotted with dark blue, the petals covered and fringed with slender hairs; stem two to five-flowered. July. *l.* solitary, linear. *h.* 3in. to 6in. Sierra Nevada.

C. elegans (elegant).* *fl.* greenish-white, purplish at base; stems three-flowered; petals not ciliate on the margin, or sparingly so. June. *h.* 8in. California, 1826. This is a rare species.

C. e. lutea (yellow). A synonym of *C. Benthami*.

C. Gunnisoni (Gunnison's).* *fl.* light lilac, yellowish-green below the middle, with a purple band encircling the base of the perianth; large, 2in. to 3in. in diameter. Rocky Mountains.

C. Leichtlinii (Leichtlin's). A synonym of *C. Nuttallii*.

C. lilacinus (lilac).* *fl.* pale pink, hairy below the middle, 1½in. across, with three segments narrow and three broad; scape slender, leafy, bearing one to five flowers. *l.*

solitary, narrow lanceolate, radical. *h.* 6in. to 8in. California, 1868. SYN. *C. umbellatus*. (B. M. 5804, under the name of *C. uniflorus*.)

C. luteus (yellow).* *fl.* terminal, two or three together; exterior segments of the perianth greenish; the inner yellow, bordered with purple hairs. September. *h.* 1ft. California, 1831. (B. R. 1567.)

C. l. oculatus (eyed). *fl.* very charming bright yellow, with a bold eye on the inside of each petal.

C. macrocarpus (large-capsuled). *fl.* very large, lavender-coloured, on stems 1ft. high. August. California, 1826. (B. R. 1152.)

C. Maweanus (Mawe's). *fl.*, sepals purplish, broadly obovate acute; petals white or bluish-purple, longer than the sepals, the surfaces more or less covered with long purplish hairs. June, July. *l.* glaucous, linear. Stem three to six-flowered. *h.* 6in. to 10in. San Francisco, &c. (B. M. 5976, figured under the name of *C. elegans*.)

C. Nuttallii (Nuttall's).* *fl.* large, 2½in. across; the three smaller segments of the perianth of a greenish colour streaked with red; the three larger segments pure white, with a purple spot at the base on the inner surface; two or three

flowers on a stalk. June. *l.* linear, glaucous. *h.* 6in. California, 1869. SYN. *C. Leichtlinii.* (B. M. 5862.)

C. pulchellus (beautiful).* *fl.* bright yellow, globular, drooping; umbels three to five-flowered, on stems from 10in. to 12in. high. Summer. California, 1832. A lovely species. (B. R. 1662.) SYN. *Cyclobothra pulchella.*

C. purpureus (purple).* *fl.*, outer segments of the perianth green and purple outside and yellow within; inner segments purple outside and yellow within. August. *h.* 3ft. Mexico, 1827. (S. B. F. G. ser. ii., 20.)

C. splendens (splendid).* *fl.* clear lilac, large. August. *h.* 1½ft. California, 1832. (B. R. 1676.)

C. umbellatus (umbelled). A synonym of *C. lilacinus*.

C. venustus (charming).* *fl.* large, white, nearly 3in. in diameter, yellow at the base, deeply stained with crimson, and blotched on each segment with crimson. *h.* 1½ft. California, 1836. See Fig. 329. (B. R. 1669.) There are three varieties of this species, viz., *brachysepalus* (short-sepaled), *lilacinus* (lilac), and *purpureus* (purple-flowered).

CALODENDRON (from *kalos*, beautiful, and *dendron*,

a tree). ORD. *Rutaceæ*. A very handsome greenhouse evergreen tree. Flowers in terminal panicles. Leaves large, opposite, simple, crenated. It will grow freely in a mixture of loam and peat. Cuttings of half-ripened wood root in sand if placed under a bell glass, in gentle bottom heat.

C. capensis (Cape). *fl.* flesh-coloured; pedicels compressed, dilated under the flower; panicle trichotomously divided. Branches opposite, or three in a whorl. *h.* 40ft. Cape of Good Hope, 1789. This is supposed to be one of the finest trees at the Cape of Good Hope. (G. C., 1883, xix., 217.) See Fig 330, for which we are indebted to Mr. Bull.

CALODRACON. *See* **Cordyline**.

CALONYCTION. *See* **Ipomœa**.

CALOPHACA (from *kalos*, beautiful, and *phake*, a lentil; in allusion to the beauty of the plant, and to its being one of the leguminous kind). ORD. *Leguminosæ*. A hardy deciduous shrub, with axillary pedunculate racemes of yellow flowers, and impari-pinnate leaves. This is well adapted for the front of shrubberies. It is somewhat difficult to propagate, except by seeds, which, however, in fine seasons, are produced in abundance. Grafted high on the common Laburnum, it forms an object at once singular, picturesque, and beautiful, whether covered with blossoms, or with its fine reddish pods.

C. wolgarica (Volga).* *fl.* yellow. May, June. *l.*, leaflets six or seven pairs, orbicular, velvety beneath, as

well as the calyces. *h.* 2ft. to 3ft. Siberia, 1786. (W. D. B. 83.)

CALOPHANES (from *kalos*, beautiful, and *phaino*, to appear; alluding to the flowers). ORD. *Acanthaceæ*. A genus of about thirty species, widely distributed, principally in the tropical regions of both hemispheres. The best garden plant is that mentioned below; it is an interesting hardy herbaceous perennial, excellent for growing in borders, in loam and peat, or sandy loam soil; and may be propagated by dividing the roots, in March.

C. oblongifolia (oblong-leaved).* *fl.* blue; corolla funnel-shaped, throat ventricose, limb bilobed, nearly equal; tube of corolla one-half longer than the calyx; pedicels axillary. August. *l.* opposite, oblong-spathulate, entire, acuminated. *h.* 1ft. Florida, &c., 1832. (S. B. F. G., ser. ii., 181.)

CALOPHYLLUM (from *kalos*, beautiful, and *phyllon*, a leaf; the leaves are large, of a beautiful green, and elegantly veined). ORD. *Guttiferæ*. Fine stove evergreen trees. Flowers disposed in axillary racemes. Leaves furnished with numerous transverse, parallel nerves. They thrive in a compost of loam, sand, and peat. Cuttings of half-ripened shoots will root in sand, if placed under a glass, in bottom heat.

C. Calaba. Calaba-tree. *fl.* white, sweet-scented, loosely racemose; racemes lateral, very short. *fr.* green. *l.* obovate or oblong, obtuse or

emarginate. *h.* 30ft. West Indies, &c., 1780.

C. inophyllum (fibrous-leaved). *fl.* snow-white, sweet-scented, loosely racemose; racemes axillary; peduncles one-flowered, usually opposite. *fr.* reddish, the size of a walnut. *l.* oblong or obovate, obtuse, but usually emarginate. Branches round. Tropics of the Old World, 1793. A medium-sized tree.

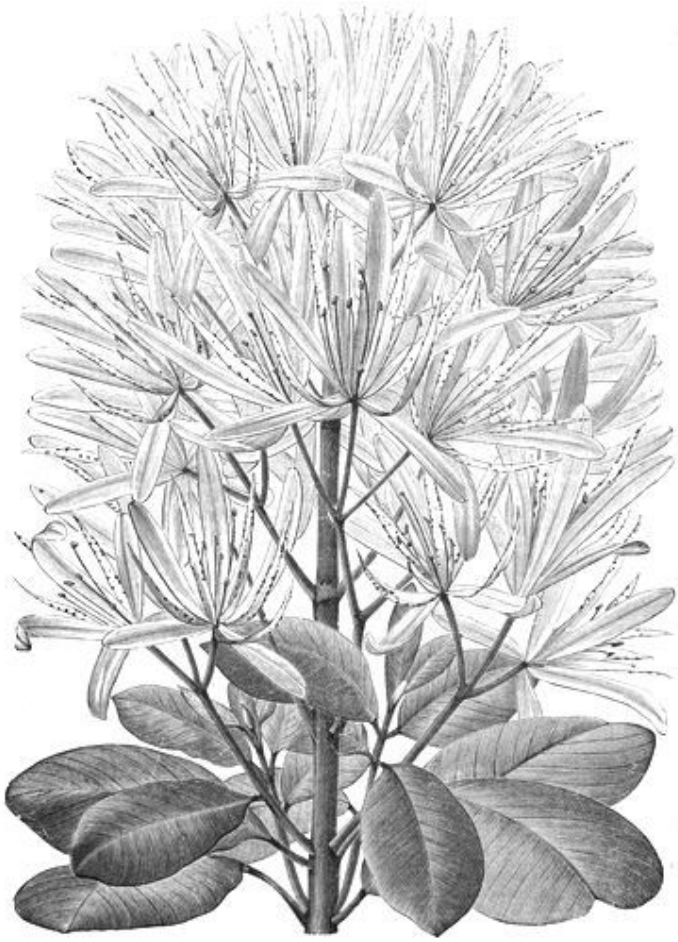


Fig. 330. Calodendron capensis.

CALOPOGON (from *kalos*, beautiful, and *pogon*, a beard; in reference to the fringe on the lip). Ord. *Orchideæ*. Very pretty, hardy, tuberous-rooted orchids, admirably suited for a good shady position at the foot of the rockwork, or for an open situation in a hardy fernery. Propagated by offsets, taken from the tuberous roots; but this method of increase is very uncertain. Perhaps the only species in

cultivation is the following:

C. pulchellus (beautiful).* *fl.* purple, with a very pretty pale yellow beard or tuft of hairs growing from the lip; two or three to a plant. Late summer. *l.* few, radical, grass-like. *h.* 1½ft. North America. 1791. SYN. *Limodorum tuberosum*. (S. B. F. G. 115.)

CALOSANTHES INDICA. A synonym of *Oroxylum indicum*.

CALOSCORDUM (from *kalos*, beautiful, and *skorodon*, garlic). ORD. *Liliaceæ*. A genus of half-hardy bulbs, allied to *Allium*, but now referred to *Nothoscordum*. For culture, *see* **Calochortus.**

C. nerinæflorum (Nerine-flowered).* *fl.* rose; umbels about twelve-flowered; spathe one-valved. June and July. *l.* narrow, semi-terete, channelled above. *h.* 6in. Chusan, 1843. (B. R. 1847, 5.)

CALOSTEMMA (from *kalos*, beautiful, and *stemma*, a crown). ORD. *Amaryllidaceæ*. Handsome greenhouse bulbous plants, natives of New Holland. Flowers funnel-shaped, irregular; perianth with the orifice surmounted by a corona; stamens erect, united by their dilated bases; ovary three-celled, many-seeded. Leaves linear-lorate.

C. album (white). *fl.* white. May. *l.* ovate, acute, 3in. to 5in. long, 2in. to 3in. broad. *h.* 1ft. 1824.

C. luteum (yellow). *fl.* yellow. November. *l.* strap-shaped, narrow. *h.* 1ft. 1819. (B. M. 2101.)

C. purpureum (purple). *fl.* purple. November. *l.* like those of *C. luteum*. *h.* 1ft. 1819. (B. M. 2100.)

CALOTHAMNUS (from *kalos*, beautiful, and *thamnos*, a shrub; in reference to the elegance of the shrubs, from their scarlet flowers and terete leaves). ORD. *Myrtaceæ*. Greenhouse evergreen shrubs. Flowers scarlet, axillary and solitary, sessile. Leaves scattered, crowded, terete. They require much the same culture as *Callistemon*. Cuttings of young wood, firm at the base, will root in sand, if covered by a hand glass, which requires to be occasionally taken off and wiped, to prevent damp.

C. quadrifidus (four-cleft). *fl.* scarlet, somewhat secund; bundles of stamens four, distinct, equal. July. *l.* glabrous (as well as the flowers). *h.* 2ft. to 4ft. West Australia, 1803. (B. M. 1506.)

C. villosa (villous). *fl.* scarlet, quinquefid; bundles of stamens equal, distinct. July to September. *l.* villous (as well as the fruit). *h.* 2ft. to 4ft. West Australia, 1823. (B. R. 1099.)

CALOTIS (from *kalos*, beautiful, and *ous*, *otos*, an ear; in reference to the chaffy scales of the pappus, or seed-head). Allied to *Bellium*. ORD. *Compositæ*. Greenhouse or half-hardy herbaceous perennials, rarely annuals, all natives of Australia. Receptacle

naked; involucre nearly equal, many-leaved, in a single or double row. They may be grown successfully in any ordinary garden soil. Propagated by divisions of the root.

C. cuneifolia (wedge-leaved).* *fl.-heads* blue, solitary, terminal. July and August. *l.* cuneate, cut, toothed at end. *h.* 1ft. 1819. Greenhouse herbaceous perennial. (B. R. 504.)

CALOTROPIS (from *kalos*, beautiful, and *tropis*, a keel; literally "beautifully twisted," apparently in reference to the corolla of *C. gigantea*). ORD. *Asclepiadeæ*. A genus of stove evergreen shrubs, or small trees. The three species bear large handsome flowers, in interpetiolar umbels. They thrive best in a mixture of loam, sand, and peat. Young cuttings, thinly dibbled in a pot of sand, strike root freely under a hand glass, in heat. Care must be taken that they do not receive an excess of moisture, or they will rot.

C. gigantea (gigantic).* *fl.* very handsome, a mixture of rose and purple; corona shorter than the gynostegium, obtuse, circinately recurved at the base; umbels sometimes, though rarely, compound, surrounded by several involucral scales. July. *l.* decussate, broad, wedge-shaped, bearded on the upper side at the base, woolly-downy on the under side, 4in. to 6in. long, 2in. to 3in. broad. *h.* 6ft. to 15ft. India, &c., 1690. (B. R. i. 58.)

C. procera (tall). *fl.* white; petals spreading, marked at the top by a purple spot. July. *l.* obovate-oblong, on short petioles, whitish from wool. *h.* 6ft. Persia, 1714. (B. R. 1792.)

CALPICARPUM. *See* **Kopsia**.

CALPIDIA. A synonym of **Pisonia** (which *see*).

CALTHA (a syncope of *kalathos*, a goblet; in allusion to the form of the perianth, which may be likened to a golden cup). Marsh Marigold. ORD. *Ranunculaceæ*. Hardy herbaceous perennials, of easy culture on the margin of a piece of water, or in a marshy bog, or in the ordinary border, where their showy blossoms look very brilliant. Propagation is readily effected by dividing the roots, in early spring, or in summer after flowering.

C. leptosepala (slender-sepaled).* *fl.* pure white, one to two upon erect, scape-like peduncles. May, June. *l.* radical, cordate, the margins nearly entire, or sometimes crenate. *h.* 1ft. Northwestern America, 1827. (H. F. B. A. 1, 10.)



Fig. 331. Caltha palustris monstrosa plena.

C. palustris (marsh).* *fl.* golden-coloured, large; peduncles furrowed. Spring. *l.* cordate, somewhat orbicular, roundly-crenate, with rounded auricles. Stems dichotomous, erect. *h.* 1ft. Great Britain. (Sy. En. B. 40.) The double forms of this species, under the names of *nana plena* and *monstrosa plena* (see Fig. 331) are excellent plants, and, though growing best in the immediate vicinity of water, and most appropriate for rough scenery, they, like the type, do very well in ordinary well-enriched soil. A

variety named *purpurascens*, from Southern Europe, is also showy, more erect, and branching; the shoots and pedicels purplish.

C. p. biflora (two-flowered). A twin-flowered variety of *C. palustris*. North America, 1827. This is not quite so tall as the type, and the flowers are rather larger.

C. p. parnassifolia (Parnassia-leaved). *fl.* yellow, on few-flowered peduncles. April, May. *l.* cordate-ovate, crenated. *h.* 3in. to 4in. North America, 1815.

C. radicans (rooting).* *fl.* bright yellow, several in small cyme. April, May. *l.* reniform-cordate, sharply crenate-serrate, spreading. *h.* 6in. Scotland. (Sy. En. B. 41.)

CALTROPS. *See* **Tribulus**.

CALTROPS, WATER. *See* **Trapa natans**.

CALUMBA, FALSE. *See* **Coscinium fenestratum**.

CALUMBA ROOT. *See* **Jateorrhiza Calumba**.

CALUMBA WOOD. *See Coscinium fenestratum*.

CALYCANTHACEÆ. A natural order of shrubs, with square stems, having four woody axes surrounding the central one. Flowers solitary, lurid; calyx of numerous coloured sepals compounded with the petals. Leaves opposite, entire, exstipulate. The two genera known are *Calycanthus* and *Chimonanthus*.

CALYCANTHUS (from *kalyx*, *kalykos*, a calyx, and *anthos*, a flower; in reference to the calyx being

coloured, and appearing like a corolla). Allspice. ORD. *Calycanthaceæ*. A genus of hardy, deciduous, North American shrubs. Flowers lurid purple, axillary, and terminal, stalked, sweet-scented; stamens numerous. Leaves opposite, oval or ovate-lanceolate, entire, generally rough on the surface; sweet-scented. All are handsome and well worth growing. They thrive best in a peaty compost, but grow freely in almost any soil. Increased by layers, put down in the summer; or by seed, sown as soon as ripe, or in spring, in a cold frame.

C. floridus (Floridan).* Carolina Allspice. *fl.* with a sweet apple scent. May. *l.* ovate, downy beneath, as well as the branchlets. Branches spreading. Wood and roots smelling strongly of camphor. *h.* 4ft. to 6ft. Carolina, 1726. See Fig. 332. (B. M. 503.) There are several varieties of this species.



Fig. 332. Flowering Branch of Calycanthus floridus.

C. glaucus (glaucous).* *fl.* lurid purple, not strongly scented. May. *l.* ovate-lanceolate, acuminated, glaucous and pubescent beneath. *h.* 4ft. to 6ft. Carolina, 1726. Syn. *C. fertilis*. (B. R. 404.) *C. oblongifolius* is a variety with ovate-lanceolate elongated leaves.



FIG. 333. FLOWERING BRANCH OF CALYCANTHUS LÆVIGATUS.

C. lævigatus (smooth-leaved).* *fl.* lurid purple. May. *l.* oblong, thin, either blunt or taper-pointed, bright green, and glabrous, or nearly so, on both sides, or rather pale beneath. Branches strictly erect. *h.* 3ft. to 6ft. Mountains of Pennsylvania, &c., 1806. See Fig. 333. (B. R. 481.)

C. macrophyllus (large-leaved). A garden synonym of *C. occidentalis*.

C. occidentalis (Western).* *fl.* brick-red, sweet-scented, 3in. to 4in. across, each petal about 2in. long and ½in. broad. June to October. *l.* oblong or ovate-cordate, acuminate, slightly pubescent on the veins only

beneath. *h.* 6ft. to 12ft. California, 1831. In California, this is called the Sweet-scented Shrub. SYN. *C. macrophyllus*, of gardens. (B. M. 4808.)

CALYCIFLORÆ. A sub-division of dicotyledonous plants, having the stamens inserted on the calyx or disk.

CALYCIFORM. Formed like a calyx.

CALYCINE. Of, or belonging to, the calyx.

CALYCOPHYLLUM (from *kalyx*, a calyx, and *phyllon*, a leaf; in allusion to one of the teeth of the calyx being expanded into a large petiolate coloured leaf). ORD. *Rubiaceæ*. Stove evergreen shrubs, requiring a compost of loam, peat, and a little sand and charcoal. Cuttings of half ripe shoots will root in sand if placed under a bell glass, in bottom heat.

C. candidissimum (whitest).* *fl.*, corolla white, campanulate, with a bearded throat, three together, the middle one bearing a petiolate leaf, but the two lateral ones naked; corymbs terminal. *l.* ovate, bluntly acuminated, 2in. to 3in. long. *h.* 30ft. Cuba, 1830.

CALYCOTOME (from *kalyx*, *kalykos*, calyx, and *tome*, a section; lips of calyx fall off). ORD. *Leguminosæ*. A small genus of hardy, divaricately-branched, spiny shrubs, formerly included as a section of *Cytisus*. Flowers yellow, disposed in short branched leafy fasicles. For culture, *see* **Cytisus**.

C. spinosa (spiny). *fl.* yellow. June

and July. *l.*, leaflets obovate-oblong. Branches angular, spiny. *h.* 5ft. to 6ft. Genoa, Corsica, &c., 1846. (B. R. 55.)

CALYCULATE. Having bracts so placed as to resemble an external or additional calyx.

CALYMMODON. *See* **Polypodium**.

CALYPSO (from the beautiful nymph, *Calypso*, or from Greek *kalypto*, to conceal; in reference to its place of growth). ORD. *Orchideæ*. An elegant terrestrial monotypic genus. It thrives well in half-shady spots on the margins of a rock garden or artificial bog, in a light, moist, vegetable soil, composed of peat, leaf soil, and sand, mulched with cocoa-nut fibre refuse in winter. Propagated by offsets.

C. borealis (Northern).* *fl.* solitary, delicate rose and brown, with a yellow crest on the lip; labellum longer than the sepals, the lateral lobes cohering in their upper part over the saccate central one, which is usually bifid at the tip, resembling those of a Cypripedium. Summer. *l.* solitary, thin, many-nerved, ovate or cordate. Stems usually thickening into pseudo-bulbs. *h.* 1ft. High latitudes of Northern hemisphere, 1820. (B. M. 2763.)

CALYPTRA. Literally an extinguisher; applied to the hood which covers the theca in mosses.

CALYPTRANTHES (from *kalyptra*, a covering, and

anthos, a flower; in allusion to the operculum of the flower). ORD. *Myrtaceæ*. Strong-growing stove evergreen shrubs or small trees. Peduncles axillary, many-flowered. Leaves feather-veined. They are of easy culture, in a compost of loam and peat, and may be propagated by layers, or by cuttings, placed in heat.

C. Chytraculia (Chytraculia). *fl.* white, small, glomerate; peduncles axillary and terminal, trichotomous, panicled, and are, as well as the flowers, clothed with rufous velvety down. March. *l.* ovate, attenuated at the apex, stiffish, glabrous. *h.* 10ft. Jamaica, 1778. (N. S. 1, 26.)

C. Syzygium (Syzygium). *fl.* white, on short pedicels; peduncles axillary, trichotomous, many-flowered. May to July. *l.* ovate, obtuse, stiff. *h.* 10ft. to 12ft. Jamaica, 1779.

CALYPTRARIA. *See* **Centronia**.

CALYPTRATE. Resembling an extinguisher.

CALYPTRIFORM. Shaped like an extinguisher.

CALYPTRION. *See* **Corynostylis**.

CALYPTROCALYX (from *kalyptra*, an extinguisher, and *kalyx*, a calyx, in allusion to the form of the outer perianth segments). ORD. *Palmeæ*. A monotypic genus of stove palms. For culture, *see* **Calamus.**

C. spicatus (spiked). *fl.*, spadices elongated, spicate, leafy at base; spathe opening longitudinally. *l.* terminal, pinnatisect; segments

reduplicate, linear, acuminate, bifid at the apex; petiole fibrous at the base. Caudex finally smooth. *h.* 12ft. Moluccas. SYNS. *Areca* and *Pinanga globosa*.

CALYPTROGYNE (from *kalyptra*, an extinguisher, and *gyne*, a woman—pistil—in allusion to the form of the pistil). Including *Calyptronoma*. ORD. *Palmeæ*. A small genus comprising five species of handsome stove palms, allied to *Geonoma* (which *see* for cultivation).

C. Ghiesbreghtiana (Ghiesbreght's). *fl.*, peduncles erect, overtopping the leaves, bearing a single cylindrical, undivided spadix, 9in. to 12in. in length. *l.* pinnate, 2ft. to 5ft. long; pinnæ opposite or alternate, sessile, of unequal breadth, the narrower ones one to two-nerved, the broader ones six to ten-nerved, usually from six to twelve on each side of the rachis; the intervals between the pinnæ vary from 1in. to 2in.; petiole broadly sheathing at the base, from a few inches to 1½ft. long. Stem short or absent. Mexico. A very elegant dwarf-growing species. SYNS. *Geonoma Ghiesbreghtiana*, *G. magnifica* and *G. Verschaffeltii*. (B. M. 5782.)

C. spicigera (ear-bearing). *l.* irregularly pinnate, 2ft. to 3ft. long, 1ft. broad, deeply bifid at apex, rich bright green; petioles short,

sheathing at the base, flat on the upper side, rounded below. Stems stout. *h.* 5ft. Guatemala. A very elegant species.

C. Swartzii (Swartz's). *l.* equally pinnatisect; pinnæ deeply reduplicate at the base, bifid at the top. Trunk smooth. *h.* 50ft. to 60ft. Jamaica, 1878. A handsome plant when young, and useful for general decorative purposes. SYN. *Calyptronoma Swartzii*.

CALYPTRONOMA SWARTZII. *See* **Calyptrogyne Swartzii**.

CALYSTEGIA (from *kalyx*, a calyx, and *stege*, a covering; in reference to the two large persistent bracts enclosing the calyx). Bearbind. ORD. *Convolvulaceæ*. Hardy, glabrous, twining or prostrate herbs. Peduncles solitary, one-flowered; corolla campanulate, five-plicate. All the species are of easy cultivation in common garden soil. Propagation may be effected by dividing the plants; or by seeds, sown in spring.

C. dahurica (Dahurian).* *fl.*, corolla of a rosy-purple; sepals lanceolate, acute, the two outer ones broadest; peduncles tetragonal, tomentose; bracts broad-ovate, acute, longer than the calyx. July. *l.* glabrous or hairy, oblong-cordate, having the margins and nerves on the under side tomentose. Dahuria, 1826. (B. M. 2609.)

C. inflata (inflated). Synonymous with *C. sepium incarnata*.



Fig. 334. Flowering Branch of Calystegia pubescens flore-pleno.

C. pubescens flore-pleno (downy, double-flowered).* *fl.* 2in. to 3in. across; petals long, narrow, wavy, and reflexed, flesh-colour, but ultimately bright rose; pedicels 2½in. to 3½in. long. Summer and autumn. *l.* alternate, hastate, downy. China, 1844. See Fig. 334.

C. sepium (hedge). Common

Bindweed. *fl.* white, sometimes tinged with red; peduncles tetragonal, exceeding the petioles; bracts cordate, keeled, acute, longer than the calyx, but one-half shorter than the corolla. Summer. *l.* sagittate or cordate, very acute; hind lobes obtuse, or truncate, entire. Britain. A very troublesome weed. (Sy. En. B. 924.) There is a variety named *incarnata*, with rose-coloured flowers. North America. SYN. *C. inflata*. (B. M. 732.)

C. Soldanella (Soldanella-like).* Sea Bells. *fl.* pale red, with five longitudinal, yellowish plaits, large; peduncles angular, angles winged; bracts large, ovate, blunt, mucronate, generally shorter than the calyx. June. *l.* rather fleshy, reniform, entire or a little angular. Sea-shores, Britain. This pretty species can only be grown with success in a very sandy soil. (Sy. En. B. 925.)

CALYTHRIX (from *kalyx*, a calyx, and *thrix*, a hair; in reference to the lobes of the calyx, which each end in a long hair). ORD. *Myrtaceæ*. A genus of very pretty and interesting greenhouse Heath-like shrubs, natives of Australia. Flowers small; bracteoles two under each flower; they are either free or joined together at the base, sometimes in the form of an operculum. Leaves scattered, crowded, opposite, full of dots, axillary, solitary, almost sessile. They grow well in a mixture of loam, peat, and sand, with good

drainage and firm potting. Cuttings, made from young shoots, will root in April or May, if placed in sand, under a bell glass, in a cool house.

C. ericoides (Heath-like). A synonym of *C. tetragona*.

C. glabra (glabrous). A synonym of *C. tetragona*.

C. tetragona (tetragonal).* *fl.* white; bracts one-half shorter than the tube of the calyx. *l.* scattered, petiolate, glabrous; stipules deciduous. *h.* 2ft. 1825. SYNS. *C. ericoides*, *C. glabra*. (B. R. 409.)

C. angulata, *aurea*, and *breviseta* are other species which have been introduced, but are not worth house room when that described above is grown.

CALYX. The external whorl of floral leaves.

CAMARIDIUM (from *kamara*, an arched roof; in reference to the arched tip of the stigma). ORD. *Orchideæ*. A pretty stove orchid, allied to *Cymbidium*. It thrives best if grown in a shallow basket, or raised above the surface of the pots with sphagnum and broken pots.

C. ochroleucum (yellowish-white).* *fl.* yellowish-white. July. *l.* ligulate. Pseudo-bulbs oblong, compressed, smooth. *h.* 1ft. Trinidad, 1823. SYN. *Cymbidium ochroleucum*. (B. M. 4141.)

CAMAROTIS. *See* **Sarcochilus**.



Fig. 335. Camassia esculenta.

CAMASSIA (from *Quamash*, so called by the North American Indians, who eat the bulbs). Syn. *Sitocodium*. Ord. *Liliaceæ*. A small genus (two species) of handsome bulbous plants. Perianth of six segments, slightly connected at base, and spreading out horizontally, but not equally. Leaves narrow, about 1ft. long, grooved down the inside. They thrive best in a sheltered, partially-shaded situation, but will do fairly well in almost any ordinary good garden soil. A compost of loam and leaf mould, with a liberal mixture of sharp sand, suits them best. They

need not be disturbed for several years; but a top-dressing of rich soil or well-rotted manure may be given yearly. Propagated by offsets and seeds. The plants are so hardy that they ripen seeds in warm situations. These may be sown as soon as ripe, or the following spring, either in a warm situation out of doors, or in pots or boxes, under glass. The young plants make rapid progress, and should remain for at least two years in the seed beds. The best time for final transplanting is in February. Offsets are produced very freely, and should be removed either when in a dormant condition, or just previously to starting into fresh growth, and arranged in clumps or lines, placing a little sand about them.

C. esculenta (edible).* Camash or Quamash. *fl.* blue, about 2in. across; racemes loose, ten to twenty-flowered, borne on stout scapes; perianth six-cleft, the five upper segments close together, the sixth standing by itself. Summer. *l.* linear, about 1ft. high. Columbia, &c., 1837. The colour of the flowers varies from a deep blue to nearly white. See Fig. 335. (B. R. 1486.) The white-flowered form is figured in B. M. 2774, under the name of *Scilla esculenta flore albo*.

C. e. Leichtlini (Leichtlin's).* *fl.* creamy-white, larger than those of the type, with more numerous nerves in the keel of the segments of the perianth; racemes longer, and sometimes compound. Spring. *h.* 2ft. Columbia, 1853. This also differs

from the type in its more robust habit and broader leaves. SYN. *Chlorogalum Leichtlini*. (B. M. 6287.)

C. Fraseri (Fraser's).* *fl.* pale blue, smaller than those of *C. esculenta*; pedicels and scape much more slender. *l.* narrow, acute; capsule more acutely angled. *h.* 1ft. Eastern States of North America. A smaller and more slender plant. (B. M. 1574, as *Scilla esculenta*.)

CAMBESSEDESIA (named after James Cambessedes, coadjutor of Auguste St. Hilaire, in his "Flora Brasiliæ Meridionalis," and author of several botanical memoirs). ORD. *Melastomaceæ*. A genus of elegant, erect, or ascending, dichotomously branched stove shrubs or herbaceous plants. Flowers terminal and axillary, in paniculate cymes; petals five, obovate; calyx bell-shaped. Leaves sessile, opposite or verticillate, obovate, oblong or linear. They thrive best in a compost of peat and sand. Propagated by half-ripened cuttings, which root freely in a similar mixture, if placed in heat and under a hand glass. There are about eight species known to science, but probably that mentioned below is the only one in cultivation.

C. paraguayensis (Paraguay). *fl.* rose-red, ⅔in. in diameter, in terminal corymbose, glandular, hairy panicles. July. *l.* nearly 1in. long, sessile, ovate, acute, three-nerved, pale green, with entire ciliate margins. Stem annual, herbaceous, leafy. *h.* 10in. to 18in. 1880. (B. M.

6604.)

CAMBIUM. The formative fluid found between the bark and wood of Exogens, in spring.

CAMBUY FRUIT. *See* **Eugenia**.

CAMELLIA (named in honour of George Joseph Camellus or Kamel, a Moravian Jesuit and traveller in Asia, who wrote a history of the plants of the Isle of Luzon, which is inserted in the third vol. of John Ray's "Historia Plantarum"). Japanese Rose. Including *Thea.* ORD. *Ternstrœmiaceæ*. A genus of elegant hardy or nearly hardy evergreen shrubs or trees. Flowers large; sepals five or six, gradually passing from bracts into petals, the latter slightly cohering at the base; stamens numerous. Leaves coriaceous. By close attention to a few particulars in the management of these beautiful plants, much disappointment may be avoided, and a succession of flowers obtained from October till the following July. The fact of the buds frequently dropping off, deters many would-be growers from attempting the culture of the Camellia. Dryness of the atmosphere, and want of water at the roots, are generally the primary causes of failure; the remedy for these evils rests with the cultivator. The roots are apt to get matted together, compressing the earth around them into a hard ball, impervious to water; hence attention is necessary to see that the water poured into the pot thoroughly moistens all the soil. In order to form handsome plants, they should be trained with single stems to rods, and pruned, so as to make them throw out side branches from every part of the stem; they must not be placed too close to each other on the stage, or when planted out. A liberal supply of water is always necessary, but especially so during the flowering period. Plants that are required to flower early may remain in the

warm house till they commence to blossom, when they should be removed to a cold place, such as the back of a greenhouse, giving them plenty of light. Those kept in a hothouse or vinery during summer, will flower in the beginning or middle of October; and a large plant, having from fifty to one hundred buds, will continue in flower till the month of January. Those that are removed early, will blossom in January, and so succeed the others. The plants that have finished flowering should be brought back to the hothouse, where they will begin to make new wood, and be ready to come in succession next season. By thus shifting the plants from a warm to a cold situation, a regular succession will be secured from October to July. The soil should be kept constantly moist, and in the summer months the leaves occasionally syringed. Camellias flower best when kept in small pots or tubs. In order to raise and exhibit these handsome plants to the best advantage, they should be grown in a separate house, of ample height, as they never look so well as when 6ft. or 8ft. high, trained in a conical form, with branches from the root upwards; and the plants should be raised near to the glass on a movable stage, which should be lowered as they grow. In summer, they may either be placed in the open air in a sheltered spot, or the glass roof of the house can be taken off. The hardier sorts, such as the Double-red, Blush, and Pæony-flowered, succeed in the bed or border of a conservatory, if the roof can be taken off in summer, so as to admit air. If this cannot be managed, they are better grown in portable pots or boxes. The most suitable time for shifting Camellias is directly after flowering; they should then be put into a vinery or hothouse, where there is a little heat; or the warmest part of a greenhouse. They will soon begin to make

new wood, where they should be allowed to remain, amply supplied with water, till they form their flower buds, at the extremity and sides of the young growth. A few should then be removed to a cold place, and shaded during strong sunshine. In a few weeks afterwards, others may also be transferred, so as to have a regular succession of flowering plants.

Propagation. The red Camellias are generally propagated by layers, but cuttings will also succeed; the single red Camellia being raised by either cuttings, layers, or seeds. This latter forms suitable stocks on which to inarch or graft the rarer kinds. The ripened shoots of the preceding summer should be taken off in August, cutting them smoothly at a joint or bud. Two or three of the lower leaves should be taken off, and the cuttings planted firmly in the soil with a dibble. Some growers use peat earth and sand to strike in, while others prefer a loam mixed with sand and peat. The pans containing the cuttings should be kept in a plant or cold frame, without being covered with glasses, but shaded during powerful sunshine. In the following spring, such as have struck will begin to push, when they need to be placed in a gentle heat. The following September or October, the rooted plants will be fit to pot off, and in the second or third spring they may be used as stocks. Inarching or grafting is done in early spring, as soon as growth commences. When this process is completed, care must be taken to fix the pot containing the stock so that it may not be disturbed during the connection of the scion with the parent plant. The grafting being clayed over, is then covered with moss, to prevent its cracking. When independent grafting is resorted to, the mode called "side grafting" is generally employed, as in the case of Orange-trees; but the operation of tongueing is

generally omitted, as tending to weaken the stock. Liquid or other manure is not required; nor is it desirable to apply it, as it often, sooner or later, causes the destruction of the plants. As a rule, insects do not trouble this class of plants; but scale will sometimes appear, and can easily be removed by hand. Thrips occasionally put in an appearance, but a little smoke will quickly get rid of them.

C. euryoides (Eurya-like). *fl.* white; peduncles lateral, one-flowered, scaly. May to July. *l.* ovate-lanceolate, acuminate, serrated, silky beneath. Branches hairy. *h.* 4ft. China, 1822. (B. R. 983.)



Fig. 336. Flowering Branch of Camellia japonica.

C. japonica (Japanese).* Common Camellia. *fl.* variously coloured, axillary, sessile. *l.* ovate, acuminate, acutely serrated. *h.* 20ft. Japan and China, 1739. The innumerable hybrids are chiefly the offspring of this species. See Fig. 336.



FIG. 337. FLOWER OF CAMELLIA JAPONICA ANEMONÆFLORA.

C. j. anemonæflora (Anemone-flowered). All, or nearly all, the stamens, &c., in this variety are transformed into small petaloid bodies, and the flower has the general aspect of a double Anemone. See Fig. 337. (B. M. 1654.)



FIG. 338. FLOWER OF CAMELLIA OLEIFERA.

C. oleifera (oil-yielding).* *fl.* white, very numerous, fragrant, solitary. November. *l.* elliptic-oblong, acute, serrated, coriaceous, shining. *h.* 6ft. to 8ft. China, 1820. See Fig. 338. (B. R. 942.)

C. reticulata (netted-leaved). *fl.* bright rose, large, semi-double. l. oblong, acuminated, serrated, flat, reticulated. *h.* 10ft. China, 1824. There is a form of this species with full double flowers.

C. theifera (Tea-bearing). *fl.* white, spreading, of five sepals and five petals, axillary. November to spring. *l.* elliptical-oblong, obtuse, serrated, more than twice as long as broad,

dark green. *h.* 2ft. to 6ft. China, Japan, and India, 1780. This species varies very considerably. In different countries, it has become modified by cultivation. The Green and Black Teas, formerly supposed to be produced by different species, are obtained from the same bushes, but subjected to different processes.

Less-known species are: *drupifera*, *lanceolata*, *rosæflora*, and *Sasanqua*.

The true species are rarely seen in cultivation. The following is a selection of the best forms of *C. japonica*; the list is a limited one, and is capable of great extension:

ALBA PLENA,* double white; ARCHIDUCHESSE AUGUSTA, petals deep red, veined with blue, a white band; ARCHIDUCHESSE MARIE,* flowers bright red, banded with white, imbricated; AUGUSTE DELFOSSE, bright reddish-orange, stripes down the centre of petals; AUGUSTINA SUPERBA,* flowers clear rose, free bloomer; BEALII ROSEA, one of the best and latest deep crimson varieties known; BICOLOR DE LA REINE, white and rose; BONOMIANA,* ground colour white, banded with intense deep red; CARYOPHYLLOIDES,* white, marbled with rosy-carmine, flowers very large; CHANDLERII ELEGANS,* flowers large, light rose; COMTE DE GOMER,* petals soft rose, striped with

crimson, beautifully imbricated; COMTE DE PARIS, rich pink, large and full; CONTESSA LAVINIA MAGGI, pure white, broadly flamed with rosy-cerise; CONTESSA LAVINIA MAGGI ROSEA, flowers rich rosy-red, fine form, a superb variety; CORRADINO, rose, veined with salmon, centre delicate blush pink; COUNTESS OF DERBY,* beautifully imbricated, white, striped with rose; COUNTESS OF ELLESMERE,* colour varying from pure white to flesh, streaked with carnation; COUNTESS OF ORKNEY, pure white, striped with carmine, sometimes pink, shaded with deep rose; CUP OF BEAUTY,* pure white and rose, a beautifully imbricated flower; DAVID BOSCHI, clear pink, shaded with deep rose; DE LA REINE, petals white, striped with carmine; DONCKELAARII,* large flowers, semi-double, rich crimson, marbled white; DUCHESSE DE NASSAU,* flowers light pink, very large, and of superb form; DUCHESS OF BERRY, pure white, and cupped, beautifully imbricated, one of the most beautiful of all the double whites; EMPEROR OF RUSSIA, large crimson; FANNY BOLIS, white, striped and splashed with deep crimson; FIMBRIATA ALBA,* similar to *Alba plena*, outer petals notched at the edges; GENERAL CIALDINI, beautifully imbricated, bright carmine, flaked with red; HENRI

FAVRE, flowers rosy-salmon, finely imbricated; HOVEY, C. H.,* bright crimson, well imbricated; HOVEY, C. M.,* deep velvety crimson, darkly shaded, very distinct; HOVEY, MRS.,* delicate pink, very smooth in outline, medium size; IL CYGNO, flowers pure white, petals Ranunculi-formed and imbricated; IL 22 MARZO, clear rose, the petals sometimes banded with white; IMBRICATA, deep carmine, occasionally variegated; JARDIN D'HIVER, a fine variety, flowers beautifully imbricated, colour bright rose; JEFFERSONII, fine crimson; JENNY LIND,* flowers imbricated to the extreme centre, broad, and of good substance, white, striped and marbled with rose; JUBILEE,* flowers very large, with broad, round, imbricated petals, white, marbled with rose, centre pure white; LADY HUME'S BLUSH,* flowers flesh-colour, and of excellent form; LA MAESTOSA, rose, mottled with white; LEEANA SUPERBA, flowers salmon-red, very fine; LEON LEGUAY, rich crimson; MADAME AMBROISE VERSCHAFFELT,* white, shaded with blush, and dotted with red; MADAME LEBOIS, bright rose, finely imbricated, and of good form; MATHOTIANA,* flowers brilliant red, and beautifully imbricated, extra fine; MATHOTIANA ALBA, flowers large, finely imbricated to the centre, pure

white; MONTIRONI,* a fine pure white flower; MRS. ABBEY WILDER, ivory-white, striped with rose, well imbricated; MRS. COPE,* white, delicately shaded with pink, and striped with rose; MRS. DOMBRAIN,* shape and substance excellent, colour beautiful soft pink; NAPOLEON III., flowers rose, beautifully veined with deep rose, and edged with pure white; PRINCE ALBERT, white, beautifully flaked with carmine; PRINCESS BACCIOCCHI,* rich velvety carmine; PRINCESS FREDERICK WILLIAM,* flowers white, tipped with bright carmine; QUEEN OF ROSES, flowers delicate rose; REINE DES BEAUTÉS,* very delicate clear rose, fine form, extra fine variety; REINE DES FLEURS,* finely imbricated, petals of good substance and perfect symmetry, colour vermilion-red, flaked occasionally with white; RUBENS, deep rose-white stripes; SACCOIANA,* a finely imbricated flower, colour very variable, occasionally clear rose, at other times spotted with pure white; SARAH FROST, flowers bright red; STORYI, outer petals bright rose, centre almost white; TARGIONI, flowers beautifully imbricated, pure white, striped with cerise; TEUTONIA, flowers sometimes red, at other times white, but occasionally half red and half white; THOMAS MOORE,* flowers

4½in. across, perfectly round, and well imbricated, petals also round, and well filled up in the centre, colour rich carmine, shaded with crimson; TRICOLOR DE MATHOT, flowers red, marbled with white, semidouble; TRICOLOR IMBRICATA PLENA, blush white, flaked with carmine and rose; VALTEVAREDA, colour bright rose, often spotted with snowy white; WILDERII,* soft rose, of excellent form.



1. C. lactiflora. 2. C. rotundifolia Hostii. 3. C. carpathica turbinata. 4. C. carpathica alba.

Fig. 339. Group of Campanulas.

CAMOENSIA (named in honour of Luis Camoens, a celebrated Portuguese poet). Ord. *Leguminosæ*. A genus containing a couple of handsome species. *C. maxima* is the largest-flowered leguminous plant known. It thrives well in rich loam and leaf mould. Cuttings root in sandy loam, in bottom heat, if placed under a bell glass. It has not yet flowered in this country. The other species has not been

introduced.

> **C. maxima** (greatest).* *fl.* cream-colour, yellow, 1ft. long, in short axillary racemes. Angola, 1878. (T. L. S. 25, 36.)

CAMOMILE. *See* **Chamomile**.

CAMPANEA (from *campana*, a bell; alluding to the shape of the flowers). ORD. *Gesneraceæ*. Stove herbaceous climbing perennials, the only one at present introduced being *C. grandiflora*. For cultivation, *see* **Gesnera**.

> **C. grandiflora** (large-flowered).* *fl.* in axillary tufts, at ends of long, axillary, and terminal peduncles; corolla white, lined and dotted with crimson. June. *l.* opposite, oval, acuminated, oblique, soft, crenated, stalked. Plant hairy. *h.* 2ft. Santa Fé, 1848. (R. H. 1849, 241.)

CAMPANULA (diminutive of *campana*, a bell; in reference to the shape of the flowers). Bell-flower; Slipperwort. ORD. *Campanulaceæ*. A genus of mostly perennial—rarely annual or biennial—herbs. Flowers blue or white, for the most part pedunculate, usually racemose, rarely spicate or glomerate. Radical leaves usually different in form from the cauline ones, especially in size. All the species of this genus are elegant when in flower (see Fig. 339), and are very largely grown. The dwarf varieties make excellent subjects for pot culture, rockeries, or the fronts of borders. A rather rich sandy loam, with plenty of drainage, suits these plants. The forms of *C.*

pyramidalis may be kept in cold frames during the winter, and firmly repotted in summer, the crown of the plant being kept just a trifle raised above the soil, or they are at times liable to damp off, through the water lodging around the necks. During hot weather, the pots should be plunged in a bed of ashes. Campanulas are easily raised from seeds, which should be sown in spring.

General Culture. As a rule, few plants are so easily cultivated as these. The strong-growing kinds may be grown with the greatest success in ordinary garden soil, well enriched with manure, while the alpine kinds are easily managed on the rockery. Sow seeds of the annuals in April, and of the biennials in June, in the open, or in a cold frame. The perennials are chiefly propagated by dividing the roots, or by young cuttings, in spring—the latter is by far the best method of propagation with many of the species—or by seeds. Those kinds requiring special treatment are particularised, and those suitable to the rockery are so designated. Perennials, except where otherwise mentioned.

C. Adami (Adam's). *fl.* bluish, nearly erect, one on the top of each stem; corolla funnel-shaped. July. *l.* slightly ciliated; radical ones on long petioles, cuneate-spathulate, coarsely toothed at the apex; cauline ones sessile, obovate or linear. *h.* 6in. Caucasus, 1821. Alpine.

C. Allionii (Allioni's).* *fl.* usually blue, rarely white, subnutant, large, solitary. July to September. *l.*, radical ones linear-lanceolate, nearly entire, ciliated; lower ones rosulate,

bluntish. Stem rather pilose. Root creeping. *h.* 3in. to 4in. Piedmontese Alps, &c., 1820. A little gem, requiring a well-drained position, in rich sandy loam, with plenty of grit in it, and an abundance of moisture when growing. SYNS. *C. alpestris* and *C. nana*. (B. M. 6588.)

C. alpestris (rocky). A synonym of *C. Allionii*.

C. alpina (alpine).* *fl.* deep blue, few or numerous, scattered in a pyramidal manner along the whole stem. July. *l.* linear-lanceolate, repandly-crenate, woolly; radical ones crowded, narrowed at the base. Stem glabrous or woolly. *h.* 3in. to 9in. Europe, 1779. Rockery. (B. M. 957.)

C. americana (American). *fl.* erect, one to three from the axil of each bract; corollas blue, a little longer than the calycine lobes. July. *l.*, radical ones rosulate, ovate, acute, a little cordate, petiolate, serrated; cauline ones ovate-lanceolate, acuminated at both ends, serrulated. *h.* 3ft. to 6ft. North America, 1763. Borders.

C. barbata (bearded).* *fl.* nutant, disposed in a loose, often secund raceme; pedicels one-flowered, rising from the axils of the superior leaves; corolla pale blue or white (in the variety *alba*), glabrous outside, but

woolly in the mouth. June. *l.* villous, nearly entire; radical ones crowded, lanceolate; cauline ones few, ligulate. *h.* 6in. to 18in. European Alps, 1752. This is best grown on the rockery. The white variety is very handsome. (B. M. 1258.)

C. Barrelierii (Barrelier's). A synonym of *C. fragilis*.

C. betonicæfolia (Betony-leaved).* *fl.* terminal and axillary, the branchlets usually bearing three; corollas purplish-blue, with a pale yellow base, tubular. May. *l.* elliptic-oblong or ovate, acute, crenate-toothed; radical ones shortly petiolate. Stems much branched. Plant pilose. *h.* 1½ft. Mount Olympus in Bithynia, 1820. Borders. (S. F. G. 210.)

C. bononiensis (Bononian).* *fl.* bluish-violet, rather small, numerous, disposed in long racemes. July. *l.* serrulated, ovate, acuminate, dark green above, pale beneath; radical ones cordate, petiolate; upper ones stem-clasping. *h.* 2ft. to 3ft. Europe, 1773. Borders. There is also a very showy white-flowered variety.

C. cæspitosa (tufted).* *fl.* drooping, terminal, solitary, and sometimes three to four at the top of each stem; corollas deep blue or pure white (in the variety *alba*). May to August. *l.*,

radical ones crowded, on short petioles, ovate, glandularly toothed, shining. Stems numerous, tufted. Root fibrous, creeping. *h.* 4in. to 6in. Temperate parts of Europe, 1813. Rockery, delighting in rich fibrous loam and leaf mould.



Fig. 340. Flowering Stem of Campanula carpathica.

C. carpathica (Carpathian).* *fl.*

blue, broadly campanulate, disposed in loose panicles, on long peduncles, which are elongated, naked, and terminated by an erect flower. June to August. *l.*, lower ones on long petioles, ovate-roundish, cordate, toothed; upper ones on short petioles, ovate, acute. Stems leafy, branched. *h.* 9in. Transylvania, 1774. Borders or rockery. See Fig. 340. (B. M. 117.)

C. c. alba (white).* *fl.* quite white, otherwise like the type. See Fig. 339.



Fig. 341. Campanula carpathica pelviformis.

C. c. pelviformis (pelvis-formed).* *fl.* lilac, nearly 2in. across, numerously produced in lax panicles on much-branched stems, 9in. to 18in. high; fragrant. August. *l.* ovate, cordate, toothed. A distinct seedling

from *C. c. turbinata*. See Fig. 341.



Fig. 342. Campanula carpathica turbinata.

C. C. turbinata (top-shaped).* *fl.* nearly 2in. across, erect; corolla deep purple, campanulate. Summer. *l.* ovate, rigid, greyish-green, toothed, and pointed, with cordate bases, in stiff tufts. Stems short, erect. *h.* 6in. to 12in. Transylvania, 1868. Borders or rockery. See Figs. 339 and 342. There is also a desirable variety named *pallida*, with very pale purple flowers.

C. c. t. Hendersoni (Henderson's). *fl.* rich mauve, in large pyramidal racemes, rather open. July to September. *l.*, lower ones cordate, or ovate cordate, slightly crenulated, on long stalks; upper ones oblong, sessile. *h.* 1ft. Very handsome hybrid for borders.

C. caucasica (Caucasian). *fl.* few, terminal and axillary, drooping; corollas glabrous outside, but bearded inside, of a violaceous-blue colour. July. *l.* crenulated; lower ones obovate, obtuse, petiolate; upper ones lanceolate, sessile. Stems erect, branched, terete, scabrous, pilose. *h.* 6in. to 9in. Caucasus, 1804. Rockery; very pretty.

C. celtidifolia (Nettle-tree-leaved).* A synonym of *C. lactiflora*.

C. cenisia (Mont Cenis).* *fl.* deep blue, solitary, terminal, erect. June. *l.* entire; radical ones rosulate, obovate, obtuse; cauline ones ovate-oblong. Stems numerous, glabrous, or slightly pilose. *h.* 3in. Italy, &c., 1775. A rare little rockery gem, requiring a deep gritty loam and leaf soil, between stones. (A. F. P. 3, 6.)

C. Cervicaria. Throatwort. *fl.* blue, pilose outside; heads terminal, round, bracteate. July. *l.* crenately serrated; radical ones linear-lanceolate, bluntish, on short petioles; cauline ones linear-acuminated. Stem simple. *h.* 1ft. to 2ft. Mountains of Europe, 1768. Biennial. Borders. (L. B. C. 452.)

C. collina (hill).* *fl.* deep blue, funnel-shaped, few, secund, disposed in a long raceme. July. *l.*, lower ones on long petioles, ovate-oblong, crenulated; middle ones lanceolate;

upper ones linear-acuminated. Stems simple, rather pilose. *h.* 1ft. Caucasus, 1803. Borders. (B. M. 927.)

C. colorata (coloured). *fl.* purple; corolla tubular, velvety; peduncles elongated, terminal and axillary. September. *l.* scattered, lanceolate, acute, repandly denticulated. Stem branched, downy. Sikkim Himalayas, 1849. This requires frame protection during winter. (B. M. 4555.)

C. dichotoma (forked). *fl.* bluish-purple, with a paler tube, drooping, terminal, solitary in the forks of the branches and stem. July. *l.*, cauline ones ovate, acute, a little crenated. Stem erect, with dichotomous branches. Plant clothed with stiff hairs. *h.* 6in. South-western Europe, 1820. Annual. Borders. (S. F. G. 211.)

C. drabifolia (Draba-leaved). *fl.* pedicellate, opposite the leaves; corolla inflated, with a white tube and a violaceous-blue limb. July. *l.* elliptic-oblong, toothed. Stem many times forked, slightly erect. Plant hispid. *h.* 3in. Island of Samos, 1823. Annual. Rockery. (S. F. G. 215.)

C. Elatines (Elatine).* *fl.* scattered over the upper part of the plant, sometimes racemose, and sometimes panicled; corollas bluish-purple.

June to August. *l.* cordate, coarsely and acutely toothed, ovate-acute; lower ones roundish. Stem branched. Plant downy. *h.* 3in. to 6in. Piedmont, 1823. Rockery. (A. F. P. 3, 7.)

C. Erinus (Erinus).* *fl.* terminal and axillary, situated in the angles of the forks of the branches; corollas of a pale bluish-rose-colour, or white, pilose at the base, tubular. May to August. *l.* obovate or ovate, toothed. Stem much branched. Plant hispid. *h.* 3in. to 9in. Europe, 1768. Annual. Rockery. (S. F. G. 214.)

C. excisa (excised). *fl.* drooping; stem one-flowered; corollas blue, funnel-shaped. June. *l.* entire, or remotely-denticulated, linear-acuminated. Stems numerous, erect, slender, simple, naked at top. *h.* 3in. to 6in. Switzerland and Transylvania, 1820. Rockery. A rare species, requiring to be treated like *cenisia*. (L. B. C. 561.)

C. floribunda (many-flowered). A synonym of *C. isophylla*.

C. fragilis (fragile).* *fl.* clear lilac-purple, white in the centre, solitary or in pairs, axillary, erect, or nearly so, on spreading branches. July and August. *l.*, radical ones reniform, or roundish-cordate, rather deeply lobed; cauline ones broadly-ovate, slightly cordate, all stalked. *h.* 4in.

to 6in. South Italy. SYN. *C. Barrelierii*. (B. M. 6504.)

C. garganica (Gargano).* *fl.* axillary, in fascicles; corollas blue, rotate, deeply five-lobed. May to September. *l.*, radical ones reniform, on long petioles; cauline ones cordate, all crenately toothed, downy. *h.* 3in. to 6in. Italy, 1832. An extremely variable species. Rockery, in rich sandy loam. (B. R. 1768.)



Fig. 343. Flower-spike of Campanula glomerata.

C. glomerata (clustered).* *fl.* sessile, disposed in terminal heads on the branches and stems; corollas bluish-violet or white, glabrous, except the nerves outside, funnel-shaped. May

to September. *l.* serrulated; radical ones ovate, acute; bracts ovate, acuminated. Stems simple, or branched. *h.* 1ft. to 2ft. Britain, &c. Borders. See Fig. 343. (Sy. En. B. 866.) A double-flowered variety, and also a white-flowered form, are very desirable. There are numerous varieties of this species which are frequently described as distinct species. The following are among the number:

C. g. cervicaroides (Cervicaria-like). *fl.* bluish-violet, terminal and axillary. Lower leaves on long petioles. Stem flexuous, hairy.

C. g. elliptica (elliptical). *fl.* blue, large, capitate. *l.* on long petioles, elliptic; bracts large, often longer than the flowers.

C. g. nicæensis (Nice). *fl.* bluish-violet, disposed in short, dense spikes. *l.* approximate, ovate, acute, sessile.

C. g. pusilla (diminutive).* *fl.* few, capitate. *l.* round, cordate. *h.* 1in. to 2in. In addition to these, there are *aggregata* and *speciosa* (= *dahurica*). The latter is an excellent variety, with large heads of deep-coloured flowers.

C. grandiflora (large-flowered). *See* **Platycodon grandiflorum**.

C. grandis (large).* *fl.* pale violet-blue, broadly bell-shaped, with large pointed divisions, axillary and alternate, on the upper part of the stem. June. *l.* sessile, lanceolate, serrated. Stem simple, furrowed. *h.* 1ft. to 2ft. Siberia, 1842. Borders. There is also a very showy white-flowered variety named *alba*.

C. haylodgensis (Hay Lodge). *fl.* light blue, rather open, bell-shaped, few, at the ends of the stems. August. *l.*, radical ones tufted, roundish-cordate, with the margins slightly indented; cauline ones ovate-cordate, conspicuously toothed, light green. *h.* 6in. to 9in. Rockery. This is a hybrid, raised by Mr. Anderson-Henry, Hay Lodge, Edinburgh, probably between *C. carpathica* and *C. pusilla*.

C. hederacea (Ivy-like). *See* **Wahlenbergia hederacea**.

C. Hostii (Host's).* A synonym of *C. rotundifolia Hostii*.

C. isophylla (equal-leaved).* *fl.* numerous, erect, disposed in a corymb; corolla lilac-blue, with a grey centre, large, salver-shaped, deeply five-lobed. August. *l.* broadly ovate, cordate, and toothed. Stems firm. North Italy, 1868. Borders and rockery. SYN. *C. floribunda*. (B. M. 5745.)

C. i. alba (white).* *fl.* pure white; in other respects like the species. It is a charming rockery plant, flowering very freely.



FIG. 344. FLOWERS OF CAM

C. laciniata (cut-leaved). *fl.* long-stalked, in lax panicles. Stem erect, branchy, somewhat hairy. *h.* 1ft. Islands in Grecian Archipelago, 1790. This biennial species is impatient of much moisture during winter, and is therefore best kept in

a cold frame. See Fig. 344.

C. lactiflora (milk-coloured-flowered).* *fl.* in loose panicles; peduncles erect, short, usually three-flowered; corollas erect, milk-coloured, tinged with blue, or quite blue, as in the variety named *cœrulea*. July to September. *l.* sessile. ovate-lanceolate, acutely serrated. Stems branched. *h.* 2ft. to 6ft. Caucasus, 1814. Borders. SYN. *C. celtidifolia*. See Fig. 339. (B. R. 241.)



FIG. 345. CAMPANULA LANGSDORFFIANA.

C. Langsdorffiana (Langsdorff's). *fl.* blue, either solitary or in few-flowered panicles, not unlike those of *C. rotundifolia*. *l.* either entire or toothed. *h.* 3in. to 9in. Mountains of Northern Asia and America. Perennial. See Fig. 345.

C. latifolia (broad-leaved). *fl.* disposed in spicate racemes; peduncles erect, one-flowered; corolla blue, but sometimes white (in the variety *alba*) campanulately funnel-shaped, large. July. *l.* large, doubly serrated; radical ones petiolate, cordate, ovate-oblong; cauline ones sessile, ovate-acuminated. Stems simple, smooth. *h.* 1ft. to 2ft. Britain. (Sy. En. B. 868.)

C. l. eriocarpa (woolly-fruited). *fl.*, tube of calyx very hispid. *l.* less acuminated. Stem and leaves pilose and pale. Caucasus, 1823. Borders.

C. l. macrantha (large-flowered).* *fl.*, corollas purplish-blue, larger than those of the type. Stem and leaves rather pilose; teeth of leaves more distinct. A hybrid. Borders.

C. Loefflingii (Lœffling's). *fl.* solitary, terminating the naked branchlets, loosely panicled, drooping; corolla blue or violaceous, with a deeper-coloured zone beneath

the middle, white at the base, both inside and out, funnel-shaped. July. *l.* crenulated; lower ones ovate-reniform; superior ones ovate, stem-clasping. Stem much branched. Annual. *h.* 6in. to 18in. South-west Europe, 1818. (B. R. 29, 19.)

C. Loreyi (Lorey's). A synonym of *C. ramosissima*.

C. lyrata (lyrate). *fl.* disposed in a long, many-flowered, loose raceme; corolla blue, tubular, with rather pilose nerves. June. *l.*, lower ones petiolate, cordate, ovate, acute, crenated; superior ones sessile, ovate-lanceolate, serrate-toothed. Stem branched. Eastern Europe, Levant, &c., 1823. Borders.

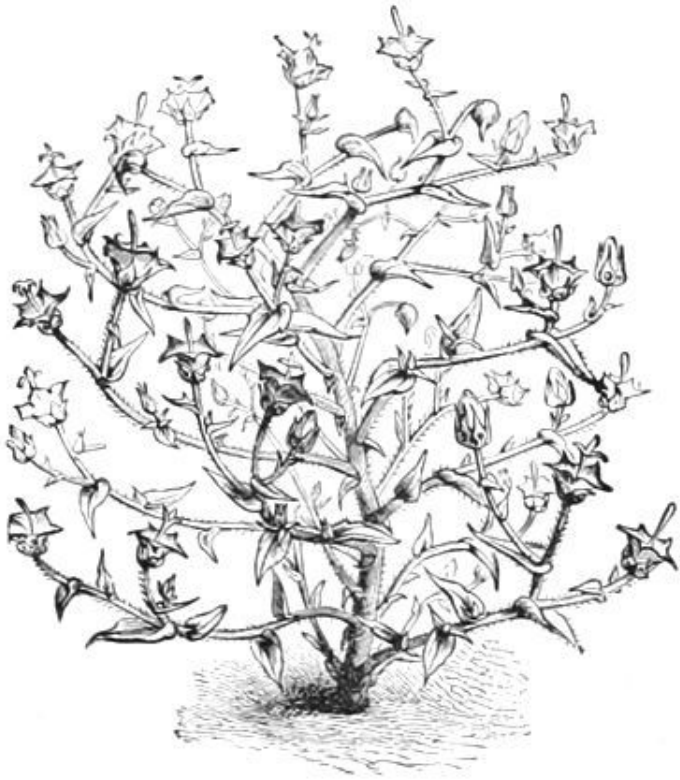


FIG. 346. CAMPANULA MACROSTYLA.

C. macrostyla (large-styled). *fl.* dull purple, reticulated with violet, solitary, on stout stalks; hairy towards the base. July. *l.*, lower ones ovate-oblong, acute; upper ones ovate-lanceolate, recurved, small for the size of the plant, hispid on both surfaces, and ciliated with bristles. *h.* 1ft. to 2ft. Taurus Mountains. Annual. Borders. The rigid habit, bristly, almost prickly, stem and leaves, curious calyx appendages,

short gaping corolla, and wonderful stigma, mark this as the most singular Campanula hitherto introduced. See Fig. 346.

C. Medium (middle-sized).* Canterbury Bells. *fl.* numerous, large, disposed in racemes; corolla blue, purple, and white, campanulate, inflated, single and double. July. *l.* sessile, ovate-lanceolate, crenately toothed. Stem erect, branched. *h.* 1ft. to 4ft. South Europe, 1597. See Fig. 347. A well-known and very handsome biennial, of which there are numerous varieties. Borders.

C. muralis (wall).* A synonym of *C. Portenschlagiana*.

C. nana (dwarf). A synonym of *C. Allionii*.

C. nitida (shining).* *fl.* blue or white, disposed in spicate racemes; corolla campanulately rotate. Summer. *l.* in rosettes, leathery, very dark and shining green, oblong, crenated; cauline ones linear-lanceolate, almost entire. Stem simple. *h.* 3in. to 9in. North America, 1731. Borders. There are also double blue and white flowered forms of this species. SYN. *C. planiflora*.

C. nobilis (noble).* *fl.* drooping, crowded towards the ends of the

branchlets; corollas reddish-violet, or white, or cream-coloured, spotted, 3in. or more long. July. *l.* hairy; lower ones petiolate, ovate, toothed; upper ones lanceolate, nearly or quite sessile. *h.* 2ft. China, 1844. Borders. (B. R. 32, 65.) There is also a white-flowered variety.

C. patula (spreading). *fl.* panicled, terminal, and axillary, on long pedicels, large, erect; corollas blue or white, funnel-shaped. July. *l.*, radical ones crowded, obovate, crenated; cauline ones linear-lanceolate, sessile, nearly entire. Stems branched. Branches diverging. Europe. Borders. (Sy. En. B. 873.)



Fig. 347. Flowering Branch of Campanula Medium.

C. peregrina (foreign).* *fl.* disposed in a dense spicate raceme, sessile; corollas of a dark violet colour at the base, not so deep in the middle, and paler towards the margins, funnel-shaped. July. *l.* crenated; lower ones obovate; superior ones ovate, acute. Stem simple, angular. *h.* 2ft. Mount

Lebanon, 1794. Borders. (B. M. 1257.)

C. persicæfolia (Peach-leaved).* *fl.* terminal and axillary, pedunculate, solitary, inclined, racemose; corollas blue and all the intermediate shades to white, large, broadly campanulate. July. *l.* glabrous, stiff, crenulated; radical ones lanceolate-obovate; cauline ones linear-lanceolate. Stems nearly simple. *h.* 1ft. to 3ft. Britain. (Sy. En. B. 871.) The forms of *C. persicæfolia* are very numerous in gardens. The following are well worth growing: *alba*, pure white, single-flowered; *alba coronata*, pure white, semi-double; *alba fl.-pl.*, flowers very double and Camellia-like, constituting one of the best hardy flowers for cutting; *cærulea coronata*, blue, in form like the white; *cærulea fl.-pl.*, flowers semi-double.

C. phrygia (Phrygian). *fl.*, corolla bluish-violet, spreading, having the nerves more intensely coloured. July. *l.* ovate-lanceolate, crenated; lower ones obtuse, upper acute. Stem branched. Branches very naked, divaricate, each terminating in a single flower. *h.* 3in. to 6in. Mount Olympus, 1820. Rockery annual.

C. planiflora (flat-flowered). A synonym of *C. nitida*.

C. Portenschlagiana (Portenschlag's).* *fl.* light blue-purple, erect, or nearly so, bell-shaped, with spreading segments, several at the ends of the shoots, and one or two in the upper axils. June, July. *l.*, radical ones broadly reniform, conspicuously but irregularly toothed, on long slender petioles; cauline ones passing from reniform to ovate. *h.* 6in. to 9in. South Europe. Rockery. SYN. *C. muralis*. (B. R. 1995.)

C. primulæfolia (Primula-leaved). *fl.* disposed in a spicate raceme; corolla blue or purple, with a whitish downy bottom, campanulately rotate, nearly glabrous. July. *l.* unequally and doubly crenated; radical ones lanceolate, bluntish; cauline ones ovate-oblong, acute. Stem hispid, simple. *h.* 1ft. to 3ft. Portugal. Borders. (B. M. 4879.)

C. pulla (russet).* *fl.* terminal, large for the size of the plant; corollas violaceous-blue, campanulate. June. *l.* glabrous, crenulately toothed; lower ones on short petioles, ovate-roundish; superior ones sessile, ovate, acute. Stems rarely pilose at the base. *h.* 3in. to 6in. Eastern Europe, 1779. Rockery, in rich sandy peat and leaf soil. (L. B. C. 554.)

C. pumila (dwarf). A synonym of *C.*

pusilla.



Fig. 348. Upper portion of Flowering Stem of Campanula punctata.

C. punctata (dotted). *fl.* whitish, spotted with red on the inner surface; large, pendulous. *l.* ovate-acute, somewhat crenate. Stem simple, erect, few-flowered. *h.* 1½ft. Siberia, Japan, &c. Border perennial. See Fig. 348.

C. pusilla (small).* *fl.* axillary and

terminal at the upper part of the slender stems, pendulous, bell-shaped, passing from deep blue to white. July, August. *l.*, radical ones tufted, broadly ovate or roundish, slightly cordate, obtusely serrated, on petioles longer than the laminæ; cauline ones linear-lanceolate, distinctly toothed, sessile. *h.* 4in. to 6in. Southern Europe. SYN. *C. pumila*. (B. M. 512.) There is a pale-coloured variety named *pallida*, and a pure white variety named *alba*, both of which, as well as the species, are most desirable for the embellishment of rockeries, or for planting in sandy soil as a front line for a border.

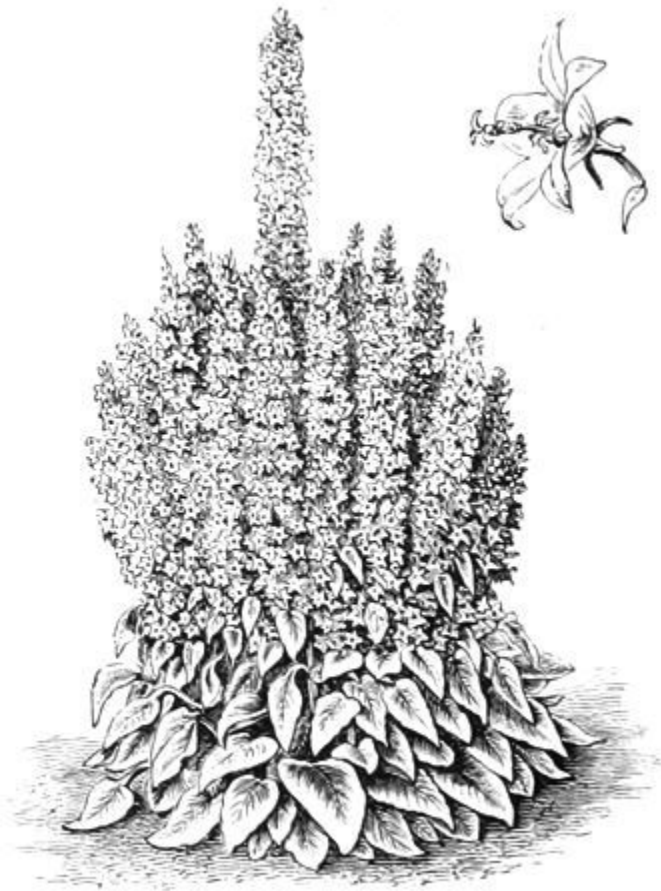


Fig. 349. Campanula pyramidalis, showing Habit and Flower.

C. pyramidalis (pyramidal).* Chimney Bell-flower. *fl.* very numerous, pedicellate, usually three together from the same bract, the whole disposed in a large pyramidal raceme, which is loose at the base; corollas pale blue or white, with a dark base. July. *l.* glandularly

toothed; lower ones petiolate, ovate-oblong, somewhat cordate; cauline ones sessile, ovate-lanceolate. Stem nearly simple, but furnished with floriferous branchlets. *h.* 4ft. to 5ft. Europe, 1596. See Figs. 349 and 350. There are several excellent varieties, but the light and dark blue and white are the best. Borders, and for pot culture.

C. Raineri (Rainer's).* *fl.* blue, erect; corolla turbinate. June. *l.* almost sessile, ovate, tomentose, remotely serrated; lower ones the smallest, obovate. Stems erect, firm, branched. Branches one-flowered, leafy. *h.* 2in. to 3in. Switzerland, Italy, &c., 1826. A beautiful little alpine, requiring a warm position in rich gritty soil; it must be religiously protected against slugs. (F. d. S. 1908.)



Fig. 350. Flowering Branch of Campanula pyramidalis.

C. ramosissima (much-branched). *fl.*, corolla with a white base; middle part or base of the lobes pale blue, and the lobes bluish-violet; peduncles long, naked, glabrous, bearing each an erect flower at the apex. June. *l.* sessile, glaucous; lower

ones obovate, crenated; middle ones ovate-lanceolate; superior ones linear, entire. Stem branched. *h.* 6in. to 12in. South Europe, 1824. Annual. SYN. *C. Loreyi*. (B. M. 2581.)

C. r. flore-albo (white-flowered) only differs from the type in having white flowers.



FIG. 351. CAMPANULA RAPUNCULUS.

C. rapunculoides (Rapunculus-

like).* *fl.* drooping, solitary, disposed in spike-formed racemes, secund, but usually hanging on all sides in strong garden specimens; corollas bluish-violet, funnel-shaped, and bearded a little inside. June. *l.* scabrous, ovate, acuminated; radical ones petiolate, cordate, crenulated; cauline ones serrulated. Stems glabrous or scabrous, usually branched in gardens, but simple in the wild state. *h.* 2ft. to 4ft. Europe. Borders. (Sy. En. B. 869.)

C. r. trachelioides (Trachelium-like). Stem and leaves, but particularly the calyx, beset with stiff white hairs.

C. Rapunculus (little turnip).* Rampion. *fl.* nearly sessile, or pedicellate, erect, forming a long raceme, which is branched at the base; corolla blue or white, funnel-shaped. July. *l.*, lower ones obovate, on short petioles, nearly entire; cauline ones sessile, linear-lanceolate, entire. Stem simple, but sometimes furnished with a few branches towards the top. *h.* 2ft. to 3ft. Europe. Borders. See Fig. 351. (Sy. En. B. 872.)

C. rhomboidalis (rhomboidal). *fl.* usually drooping, few, disposed in loose racemes, pedunculate; corolla blue, campanulate. July. *l.* sessile, ovate, acute, serrate. Stem glabrous,

or a little pilose, furnished with flower-bearing branches at top. *h.* 1ft. to 2ft. Europe, 1775. Border. SYN. *C. rhomboidea*. (L. B. C. 603.)

C. rhomboidea (diamond-leaved). A synonym of *C. rhomboidalis*.

C. rotundifolia (round-leaved).* Blue-bell; Hare-bell. *fl.* drooping, solitary, pedunculate, few on each stem; corolla deep blue, campanulate. June to August. *l.*, radical ones petiolate, cordate roundish, crenately toothed; cauline ones linear or lanceolate. Stems numerous. *h.* 6in. to 12in. Britain. (Sy. En. B. 870.)

C. r. alba (white).* *fl.* white, the same size as those of the type. Stems much more leafy.

C. r. Hostii (Host's).* *fl.* rich blue, much larger than those of the type, produced on stouter profusely branched stems. July, August. *l.*, radical ones roundish only in a very early state; cauline ones linear, acuminate, sometimes 3in. to 4in. long. SYN. *C. Hostii*. See Fig. 339. There is a white-flowered form of this, not quite so vigorous as the blue-flowered form, but the flowers are equal in size.



Fig. 352. Flowers of Campanula rotundifolia soldanellæflora.

C. r. soldanellæflora (Soldanella-flowered).* *fl.*, corolla blue, semi-double, turbinate, with shallow marginal divisions, very acutely pointed. June. *l.* long, linear, acute, sessile. Stem simple, slender. *h.* 1ft. 1870. (R. G. 473.) All the forms of *rotundifolia* are pretty, and suitable for the front of borders, or the

rockery; rising from the crevices of the latter, with their slender stems laden with flowers, they are especially beautiful. See Fig. 352.



Fig. 353. Flowers and Leaves of Campanula sarmatica.

C. sarmatica (Sarmatian).* *fl.* nutant, usually secund, terminal and axillary, forming a long, loose, scattered raceme; corolla pale blue, velvety outside. July. *l.* tomentose;

lower ones petiolate, cordate, rather hastate, crenately toothed; superior ones sessile, ovate-lanceolate, serrate-toothed. Stems simple, straight, downy. *h.* 1ft. to 2ft. Caucasus, 1803. Borders. (B. R. 237.) See Fig. 353.

C. saxatilis (rock). *fl.* three to five, disposed in a loose raceme; corolla blue, tubular, nutant. May. *l.* crenated; radical ones rosulate, somewhat spathulate; cauline ones ovate, acute. Stem erect. *h.* 6in. Crete, 1768. Rockery. Very rare.

C. Scheuchzeri (Scheuchzer's).* *fl.* dark blue, pendent, on slender stems, broadly bell-shaped. July, August. *l.*, lower ones similar to those of *C. pusilla*; upper ones linear. *h.* 3in. to 6in. South European Alps, 1813. (L. B. C. 485.)

C. Scouleri (Scouler's). *fl.* pale blue, paniculate, bell-shaped. July, August. *l.*, lower ones ovate, on long petioles, coarsely serrated; cauline ones ovate-lanceolate. *h.* 1ft. North-west America, 1876. Rockery.

C. sibirica (Siberian). *fl.* panicled, numerous, drooping; corollas bluish-violet, large. July. *l.* crenulated; radical ones crowded, petiolate, obovate, obtuse; cauline ones sessile, oblong-lanceolate, undulated, acuminated. Plant beset with bristle-like hairs. Stem branched. *h.* 1ft. to

1½ft. East Europe, 1783. Biennial. Borders. (B. M. 659.)

C. s. divergens (divergent).* *fl.* violaceous, rather large, at first erect, but drooping in the expanded state; peduncles many-flowered, and, like the stem, usually trichotomous. June. *l.*, radical ones sub-spathulate, crenulated, narrowed at the base; cauline ones sessile, lanceolate, acuminated. Plant pilose, panicled. *h.* 1½ft. Siberia, 1814. Biennial. SYN. *C. spathulata*. (S. B. F. G. ii., 256.)

C. spathulata (spathulate). A synonym of *C. sibirica divergens*.

C. speciosa (beautiful).* *fl.* pedicellate, disposed in a pyramidal raceme; corolla blue, purple or white, 1in. long, smooth outside, but often villous inside. June, July. *l.* sessile, repandly crenated; radical ones rosulate, linear-lanceolate; cauline ones linear. Stem simple. *h.* 12in. to 18in. South-west Europe, 1820. Borders. (B. M. 2649.)

C. spicata (spicate). *fl.* sessile, one to three from each bract; spike long, interrupted at the base; corolla blue, funnel-shaped. July. *l.* sessile, nearly entire; radical ones crowded, linear-lanceolate; cauline ones linear, acuminated. Stem simple. *h.* 1ft. to 2ft. Europe, 1786. Biennial. Borders. (A. F. P. 3, 46.)

C. stricta (strict). *fl.* almost sessile, few, solitary, spicate; corolla blue, tubular. July. *l.* ovate-lanceolate, acute, serrated, pilose. Stem branched, pilose. *h.* 1ft. to 2ft. Armenia, 1819. Biennial. Borders.



FIG. 354. CAMPANULA THYRSOIDEA, showing Entire Plant and Single Flower.

C. thyrsoidea (thyrsoid).* *fl.* disposed in a dense pyramidal spike, sessile; corolla sulphur-coloured,

oblong. July. *l.* entire, pilose; lower ones lanceolate, obtuse; cauline ones linear-lanceolate, acute. Stem simple, covered with leaves and flowers. Plant pilose. *h.* 1ft. to 1½ft. Alps of Europe, 1785. Biennial. Rockery. (B. M. 1290.) See Fig. 354.

C. Tommasiniana (Tommasini's).* *fl.* pale blue, tubular, slightly angled, in closely set, several-flowered, axillary cymes. July, August. *l.* nearly or quite sessile, linear-lanceolate, acuminate, distinctly serrated, there being no difference between the lower and upper ones. Stems at first erect, ultimately drooping through the weight of the flowers. *h.* 9in. to 12in. Italy. A very handsome alpine species. (B. M. 6590.)

C. Trachelium (Throat-wort).* *fl.* drooping a little, one to four together, terminating the branchlets; corolla variously coloured, campanulate, bearded inside. July. *l.* scabrous, acuminated, coarsely and crenately toothed; radical ones petiolate, cordate. Stem angular, simple or branched. *h.* 2ft. to 3ft. Europe. Borders. (Sy. En. B. 867.) There are double blue, double white, and variously shaded single forms of this species.

C. trichocalycina (hairy-calyxed). *fl.* disposed in an almost simple

terminal raceme, approximate at the top, one to three rising from each axil, at the time of flowering erect, but afterwards drooping; corolla profoundly five-cleft, funnel-shaped. July. *l.* on short petioles, ovate, acute, coarsely serrated. Stem simple. *h.* 1ft. to 3ft. Europe, 1823. Borders.

C. Van Houttei (Van Houtte's).* *fl.* dark blue, bell-shaped, pendulous, 2in. long, axillary and terminal. July, August. *l.*, lower ones roundish-cordate, crenate on long stalks; cauline ones oblong-lanceolate, sessile, serrated. *h.* 2ft. This is a very fine hybrid. Differing from it only in colour and other unimportant details is *C. Burghalti*, a handsome hybrid, found in gardens; the flowers are of a pale purple colour, very large, pendent. These are two of the best border Bell-flowers in cultivation.

C. versicolor (various-coloured). *fl.* disposed in long spicate racemes; corolla of a deep violaceous colour at bottom, pale in the middle, and the lobes pale violet, companulately rotate. July to September. *l.* serrated; radical ones petiolate, ovate, acute, rather cordate; cauline ones on short petioles, ovate-lanceolate, acuminated. Stems erect. *h.* 3ft. to 4ft. Greece, 1788. Borders. (S. F. G.

207.)

C. Vidalii (Vidal's). *fl.* large, racemose; corolla white, wax-like, between urceolate and campanulate, pendulous; disk singularly broad, surrounded by a thick bright orange-coloured annulus. July and August. *l.* thick and fleshy, oblong spathulate, viscid, coarsely serrated. *h.* 1ft. to 2ft. Azores, 1851. Perennial. Cool greenhouse or (during summer) herbaceous border. (B. M. 4748.)



FIG. 355. CAMPANULA WALDSTEINIANA.

C. Waldsteiniana (Waldstein's).* *fl.* three to four at the top of each stem, one of which is terminal, and the others from the axils of the superior leaves, always looking upwards; corollas violaceous-blue, campanulate. June. *l.* greyish, sessile, lanceolate, serrated; lower ones obtuse; superior ones long-acuminated. Stems erect, flexuous, stiff, simple, numerous from the

same root. *h.* 4in. to 6in. Hungary, 1824. See Fig. 355.

C. Wanneri (Wanner's). A synonym of *Symphyandra Wanneri*.

C. Zoysii (Zoys's).* *fl.* pedicellate, drooping; corolla pale blue, with five deeper-coloured lines, cylindrical, elongated. June. *l.* entire; radical ones crowded, petiolate, ovately obovate, obtuse; cauline ones obovate-lanceolate, and linear. Plant small, tufted. *h.* 3in. Carniola, 1813. A scarce little alpine gem, thriving in a sunny chink in rich gritty soil.

CAMPANULACEÆ. A large order of herbs or sub-shrubs. Flowers blue or white; corolla regular, bell-shaped, usually five-lobed. Leaves alternate, exstipulate. The genus best known is *Campanula*; other genera are *Adenophora*, *Jasione*, and *Phyteuma*.

CAMPANULATE. Bell-shaped.

CAMPANUMÆA (altered from *Campanula*). ORD. *Campanulaceæ*. A genus of greenhouse herbaceous, tuberous-rooted, twining perennials. Flowers involucrated, solitary, on axillary and terminal peduncles. Leaves opposite, petiolate, glaucescent beneath. Stems and branches terete. They thrive best in a rich sandy loam, with a little peat. Propagated by seeds and divisions.

C. gracilis (graceful). *fl.* pale blue; corolla membranous, with a tubular base, dilated throat, and slightly expanded, truncated limb. *l.* on long

petioles, ovate, blunt. Himalayas. SYN. *Codonopsis gracilis*. (C. H. P. t. xvi. A.)

C. inflata (inflated). *fl.* yellowish, with brownish veins; corolla herbaceous, ventricose; peduncles opposite the leaves, one-flowered. *l.* alternate, ovate-cordate, acute. Himalayas. (C. H. P. t. xvi. C.)

C. javanica (Javan). *fl.* yellowish, with brownish veins; corolla herbaceous, very broadly campanulate, with five spreading lobes. *l.* variable, opposite and alternate, ovate-cordate, crenate. Himalayas. (C. H. P. t. xvi. B.)

CAMPEACHY WOOD, or **LOGWOOD**. *See* **Hæmatoxylon campechianum**.

CAMPHORA (Camphor, commercial name of its chief product). Camphor-tree. ORD. *Laurineæ*. Cool stove evergreen trees, now referred to *Cinnamomum*. The true Camphor of commerce is a product of the oil procured from the wood, branches, and leaves of this tree, by means of dry distillation. The species thrives in a compost of peat and loam, and may be propagated by cuttings.

C. officinalis (officinal). *fl.* greenish-white. March to June. *l.* triple-nerved, lanceolate, ovate. *h.* 20ft. Japan, 1727. SYN. *Cinnamomum Camphora*.

CAMPHOR-TREE. *See* **Camphora**.

CAMPION. *See* **Silene**.

CAMPION, MOSS. *See* **Silene acaulis**.

CAMPION, ROSE. *See* **Lychnis**.

CAMPSIDIUM (from *kampsis*, a curving). ORD. *Bignoniaceæ*. A small genus, the best-known (perhaps the only) species being a handsome greenhouse climber. For culture, *see* **Bignonia**.

C. chilense (Chilian). Pipil Boqui. *fl.* rich orange colour; corolla tubular, almost regular; anthers parallel. *l.* pinnate, dark shining green. *h.* 30ft. to 40ft. Chili. (G. C. 1870, 1182.)

CAMPTERIA. Included under **Pteris** (which *see*).

CAMPTODIUM. *See* **Nephrodium**.

CAMPTOPUS (from *kamptos*, curved, and *pous*, a foot; the flower-stalk is curved downwardly). ORD. *Rubiaceæ*. A curious shrub, now referred to *Cephaelis*. It requires a most stove temperature. Cuttings will root in sandy loam, under a hand glass, in bottom heat.

C. Mannii (Mann's). *fl.* white, numerously produced in subglobose, compound heads; peduncles stout, scarlet, drooping, from 12in. to 18in. long. Summer. *l.* large, opposite, obovate or obovate-lanceolate, glabrous, coriaceous; midrib thick, red beneath. *h.* 15ft. Fernando Po, 1863. (B. M. 5755.)

CAMPTOSORUS. *See* **Scolopendrium**.

CAMPYLANTHERA. A synonym of **Pronaya**.

CAMPYLIA. Included under **Pelargonium**.

CAMPYLOBOTRYS. *See* **Hoffmannia**.

CAMPYLONEURON. *See* Polypodium.

CAMWOOD. *See* **Baphia.**

CANADA BALSAM. *See* **Abies balsamea.**

CANADA RICE. *See* **Zizania aquatica**.

CANADA TEA. *See* **Gaultheria procumbens**.

CANALICULATE. Channelled, or furrowed.

CANARINA (so named from its habitat). SYN. *Pernettya* (of Scopoli). ORD. *Campanulaceæ*. A beautiful, glaucescent, greenhouse, herbaceous perennial. It thrives in a compost of loam, leaf mould, thoroughly decomposed manure, and sand, in equal parts; ample root space and perfect drainage are essential, and when new growth commences, a little extra heat will considerably accelerate the development of the flowers. Water should be liberally supplied during the growing season. The plant may be propagated by divisions when repotting, in January; or by young cuttings, inserted in sandy soil, in a gentle warmth.

C. Campanula (bell-shaped).* *fl.* of a yellowish purple or orange colour, with red nerves, drooping, solitary, terminating axillary branchlets; corolla six-lobed at the apex, large, campanulate. January to March. *l.* opposite, hastately sub-cordate, irregularly toothed. *h.* 3ft. to 4ft. Canary Islands, 1696. (B. M. 444.)

CANARIUM (from *Canari*, its vernacular name in the Malay language). ORD. *Burseraceæ.* A rather large genus of stove trees. Flowers small, in axillary panicles; petals usually three, valvate, or slightly imbricate in the bud. Drupe ovoid or ellipsoid, often three-angled. Leaves large, impari-pinnate. For culture, *see* **Boswellia.**

C. commune (common). *fl.* white, glomerate, nearly sessile, bracteate; panicle terminal. *l.*, leaflets seven to nine, on long stalks, ovate-oblong, bluntly acuminated, entire. India. The fruit has a thin olive skin, and when the nuts are mature, they contain a sweet kernel, which does not become rancid, and resembles a Sweet Chestnut; they are also used for various economic purposes. (B. M. Pl. 61.)

CANARY-BIRD FLOWER. *See* **Tropæolum peregrinum**.

CANAVALIA (from *Canavali*, the name of one of the species in Malabar). ORD. *Leguminosæ*. A genus of elegant twining or climbing stove herbs or subshrubs. Flowers in racemes, produced from the axils of the leaves; calyx bell-shaped, two-lipped; corolla papilionaceous. Leaves trifoliate. They are well adapted for training up the rafters in a stove or warm greenhouse. For culture, *see* **Dolichos**.

C. bonariensis (Buenos Ayrean). *fl.* purple; racemes drooping, longer than the leaves. July and August. *l.*, leaflets ovate, obtuse, coriaceous,

glabrous. Buenos Ayres, 1824. (B. R. 1199.)

C. ensiformis (ensiform).* *fl.* white, red, pendulous; racemes longer than the leaves. June. *l.*, leaflets ovate, acute. India, 1790. SYN. *C. gladiata*. (B. M. 4027.)

C. gladiata (sword-podded). Synonymous with *C. ensiformis*.

C. obtusifolia (obtuse-leaved). *fl.* purple. July, August. *l.*, leaflets ovate obtuse. Malabar, 1820.

CANBIA (named in honour of W. M. Canby, of Wilmington, Delaware). ORD. *Papaveraceæ*. A monotypic genus, remarkable for its persistent (not caducous) corolla. Sepals three, caducous; petals six, barely 1/6in. in length; stamens six to nine.



FIG. 356. CANBIA CANDIDA.

B. candida (glossy white). *fl.* white, solitary, on little scapes. *l.* alternate, linear, entire. *h.* about 1in. Discovered in sandy soil in South-east California, in 1876. See Fig. 356.

CANCELLATE. Latticed; resembling lattice-work.

CANDELABRUM or **CHANDELIER TREE**. *See* **Pandanus candelabrum**.

CANDLEBERRY MYRTLE. *See* **Myrica cereifera**.

CANDLEBERRY-TREE. *See* **Aleurites triloba**.

CANDLE-TREE. *See* **Parmentiera cerifera**.

CANDOLLEA (named after Augustus Pyramus De Candolle, formerly Professor of Botany, at Geneva, and author of numerous botanical works). ORD. *Dilleniaceæ*. A genus of very ornamental greenhouse evergreen shrubs, natives of Australia. Flowers yellow, sub-solitary, at the tips of the branches; sepals five, oval, mucronate; petals obovate or obcordate. They thrive in a compost of equal parts loam and peat, with which sufficient sand may be mixed to render the whole porous. Cuttings will root, if placed in a similar compost, under a hand glass; seeds are also sometimes obtainable.



FIG. 357. FLOWERS AND BUDS OF CANDOLLEA CUNEIFORMIS.

C. cuneiformis (wedge-shaped).* *fl.* yellow. July. *l.* smooth, obovately cuneated, blunt at the top, entire. Branches cinerous. *h.* 7ft. 1824. See Fig. 357. (B. M. 2711.)

C. Huegelii (Huegel's). *fl.* at tops of the branches, among the leaves, on short pedicels; sepals acuminate, hoary outside, longer than the petals. May. *l.* linear, quite entire, villous when young. *h.* 6ft. 1837.

C. tetrandra (four-stamened). *fl.* yellow, solitary; petals emarginate. June. *l.* oblong, cuneate, toothed. *h.* 7ft. 1842. (B. R. 1843, 50.)

CANDYTUFT. *See* **Iberis**.

CANE-BRAKE. A common name for different species of *Arundinaria*.

CANELLA (a diminutive of *canna*, a reed; in allusion to the rolled bark, like cinnamon). ORD. *Canellaceæ*. The best-known species of this genus is a very ornamental and economically valuable stove evergreen tree, which thrives in a mixture of loam and sand. Well-ripened cuttings, taken off at a joint, will root in sand, under a hand glass, with bottom heat, in April or May; but care should be taken not to deprive them of any of their leaves. Sweet says that large old cuttings are best.

C. alba (white).* *fl.* violet-colour, small, growing at the tops of branches in cluster, but upon divided peduncles. *l.* alternate, obovate, cuneated at the base, white,

or glaucous beneath, somewhat coriaceous, sometimes full of pellucid dots. *h.* 15ft. The whole tree is very aromatic, and, when in blossom, perfumes the neighbourhood. The flowers dried, and softened again in warm water, have a fragrant odour, nearly approaching to that of Musk. The leaves have a strong smell of Laurel. West Indies, &c., 1735. (T. L. S. i., 8.)

CANELLACEÆ. A small order of tropical American aromatic shrubs, allied to *Bixineœ*, from which it differs only in having the albumen firmer, and with a smaller embryo. The genera are *Canella* and *Cinnamodendron*.

CANESCENT. Hoary, approaching to white.

CANICIDIA. A synonym of **Rourea** (which *see*).

CANISTRUM (from *canistrum*, a basket; in allusion to the inflorescence resembling a basket of flowers). ORD. *Bromeliaceœ*. Stove epiphytes, with showy inflorescence, and requiring similar culture to **Billbergia** (which *see*).

C. aurantiacum (orange).* *fl.* orange-yellow, in a cup-shaped involucre of orange-red bracts; scapes erect. June to September. *l.* ligulate-lorate denticulate, deflexed. Brazil, 1873. See Fig. 358. (B. H. 1873, 15.)



FIG. 358. CANISTRUM AURANTIACUM.

C. eburneum (ivory).* *fl.* white, green, disposed in a depressed head, the white ovaries of which give an appearance as of eggs in a basket. May. *l.* tufted, mottled, the central ones cream-coloured, surrounding the flower-heads. *h.* 2ft. SYNS. *Guzmannia fragrans* and *Nidularium Lindeni*. Brazil, 1876. (B. H. 1879, 13, 14.)

C. roseum (rose-coloured). *fl.* white, green; bracts rosy. 1879.

C. viride (green). *fl.* green. *l.* green, canaliculate, acuminate, irregularly toothed. Brazil, 1875. SYN. *Nidularium latifolium*. (B. H. 1874,

16.)

CANKER. This is a disease presenting very serious difficulties, principally in the cultivation of Apples and Pears. Both the trees and fruits, especially of some varieties, are, in many localities, so far injured as not to be worth cultivating. What causes the disease is not at all times known; indeed, it is, in most cases, but imperfectly understood. Were the causes better known, the remedy might generally be much easier found. Some of the primary causes are cold and undrained soil, severe and careless pruning, extreme variations of temperature, and excessive growth, made late in the season, when it has not sufficient time to get well ripened. Trees that are badly Cankered may often be improved by lifting, and replanting in improved or better-drained soil. Immediately the disease is detected in young trees, by the cracking of the bark or the skin of the fruits, measures should be taken to find the cause, if possible, and avert its progress. Some Pear-trees, in various localities, will not produce fruit without Canker in the open garden, but they will do so when planted against a wall; and as such may be the very best varieties, trees should be placed in the latter position. The removal of large branches, late in spring, will sometimes produce Canker, at the point where mutilation has taken place; and it may be caused by severe late pruning, which induces the growth of soft shoots that are almost certain to be injured by severe frosts. The difference in the seasons, as regards the amount of moisture, is one that can scarcely be provided against. One spring may be favourable to rapid growth, and the following may be most unfavourable, thereby arresting the natural flow of the sap until the latter

part of the summer, when excessive growth will probably take place. Such checks invariably produce Canker. At times, the disease seems caused by the punctures of insects, in an early stage, on the stems or branches. In such instances, a thorough cleansing, and a smearing of quicklime, made into a wash, often proves successful. Strong tobacco water will destroy insects, and a weak solution of sulphuric acid is also fatal to lichens and mosses, which should never be allowed to obtain a footing. The chief preventatives, therefore, are: Planting in well-drained soil; avoiding the use of any rank manure, to cause excessive growth; changing the old, or adding new, soil to injured trees; careful pruning, and the encouragement of early growth in spring, and subsequent well ripening in autumn.



Fig. 359. Canna indica, showing Habit, Flowers, and Leaves.

CANNA (derivation uncertain; according to some, from *cana*, the Celtic name for cane, or reed). Indian

Shot. ORD. *Scitamineæ*. A large genus of stove herbaceous perennials, very extensively employed in sub-tropical and other methods of summer gardening. Flowers spathaceous; anther attached to the edge of the petal-like filament. Leaves very ornamental. Few plants are more easily grown, or more quickly propagated. Seeds of many of the finer sorts may be bought cheaply from respectable seedsmen. These should be sown in heat, in February or March. A warm house or cucumber pit is the best place for sowing the seeds, which are very hard. If soaked in tepid water for twenty-four hours, germination will be materially stimulated. A mixture of sand and leaf mould is best for them, and a covering of 1½in. or 2in. of earth is not excessive. They should be sown thinly, in pans. As Cannas are gross, and have somewhat brittle roots in a young state, it is a good plan to sow the seed singly in small pots. This method preserves all the roots intact, and prevents any check in potting off or dividing the plants out of seed pans or boxes. When this is not done, the plants must be potted off singly, as soon as they have formed two leaves, 3in. pots being used for the first shift. The soil can hardly be too rich and porous. Equal parts rotted dung, loam, and sand, with a little peat, form a capital mixture for them. The plants must be kept in a growing temperature of 60deg. or so, during their earlier stages, and shifted as required into larger pots. Under proper management, the roots will fill 6in. pots by the middle or end of May. They ought not to be planted out till the end of May or the first week in June. Should fairly rich soil and a sheltered place be selected for them, they will not only grow, but flower freely during the late summer and autumn months. Cannas are also very effective indoors,

either for greenhouse or room decoration. For these purposes they may be grown on in 8in., 10in., or even 12in., pots, with rich soil, and placed either in a stove, intermediate house, warm or cool conservatory, window, or room. Liberal supplies of manure water will be of very great benefit. Propagation is also effected by means of divisions; they form a root-stock very like some of the commoner and more free-growing Irises, each portion of which, with bud and roots attached, may be converted into an independent plant. The best mode of procedure is to divide the root-stock in early spring, when the pieces may be placed in 4in. pots at once; and, if plunged in a bottom heat of 60deg. or so, they will quickly resume root action and grow rapidly. They may also be propagated by division without bottom heat. Those who grow large quantities seldom put their plants in pots at all. Stored in pots or boxes for the winter, they are divided and placed singly in similar positions in the spring, and transferred from such vessels into the open air. The best open site for Cannas is in a sheltered spot, with a good depth of rich soil, and plenty of moisture. In such a position, their noble leaves are not so much injured by rough winds. After flowering, or at the end of the season, they may be lifted and stored away in boxes, or in pots of earth, in dry, frost-proof sheds, or under greenhouse stages during winter. In warm, sheltered situations, with dry bottoms, they winter safely in the open, provided their crowns are covered with 1ft. of litter or cocoa fibre refuse. But where the soil is wet and cold, or the situation bleak and unprotected, they should be lifted and stored away, as already described.

C. Achiras variegata (variegated

Achiras).* *fl.* dark red. August. *l.* bright green, striped with white and yellow. Better adapted for indoor culture than out.

C. Annæi (M. Année's).* *fl.* salmon-colour, large, well formed. June. *l.* large, green, glaucescent, ovate-acute, 2ft. long by 10in. wide. Stems vigorous, stiff, sea-green. *h.* 6ft. (R. H. 1861, 470.) Of this there are many forms, the best of which are:

C. A. discolor (two-coloured).* *fl.* rosy-yellow, few, small. Late summer. *l.* lanceolate, erect, light red, 2½ft. long, 10in. wide. Stems dark red. *h.* 3ft. to 5ft.

C. A. fulgida (red).* *fl.* orange-red, large, well-opened. *l.* 20in. long, 6in. wide, deep purple, erect. Stems small, dark red. *h.* 3ft. to 5ft.

C. A. rosea (rose).* *fl.* carmine-rose colour, small, few. Late summer. *l.* 2ft. long, very narrow, pointed, erect. Stems dark green, with a reddish base, numerous. *h.* 5ft.

C. Auguste Ferrier (A. Ferrier's).* *fl.* orange-red, medium-sized. *l.* very large, oval, erect, pointed, deep green, with narrow stripes and margins of dark purplish-red. Stem green, very thick, downy. *h.* 10ft.

C. aurantiaca (orange). *fl.*, segments of perianth rose-coloured outside, reddish inside; upper lip orange,

lower one yellow, dotted with orange. *l.* large, broadly lanceolate, pale green; margins slightly undulated. *h.* 6½ft. Brazil, 1824.

C. Bihorelli (Bihorell's).* *fl.* deep crimson, produced upon branching spikes in great abundance. *l.* red when young, changing to deep bronze with age. *h.* 6ft. to 7ft. One of the best.

C. Daniel Hooibrenk. *fl.* bright orange, large, freely produced. *l.* large, glaucous-green, acuminate, with bronzy margin. Stalks strong, green. *h.* 6ft.

C. Depute Henon.* *fl.* pure canary-colour, with a yellowish base, large; spikes numerous, rising gracefully above the foliage to a height of 1½ft. *l.* ovate-acute, erect. *h.* 4ft.

C. discolor (two-coloured).* *fl.* red. *l.* very large, broad, ovate-oblong; lower ones tinged with a blood-red hue; upper ones streaked with purple. Stems stout, reddish. *h.* 6ft. South America, 1872. (B. R. 1231.)

C. edulis (edible). *fl.* large, with purple outer segments, inner ones yellowish. *l.* broadly ovate-lanceolate, green, tinged with maroon. Stems deep purple tinged. *h.* 6ft. to 7ft. Peru, 1820. (B. R. 775.)

C. expansa-rubra (red-expanded).* *fl.* large, with rounded bright purple

segments. *l.* very large, sometimes over 4ft. long, and nearly 2ft. broad, ovate, obtuse, spreading horizontally, dark red. Stems numerous, very thick. *h.* 4ft. to 6ft.

C. flaccida (flaccid). *fl.* yellow, very large, not very unlike those of the native *Iris pseudo-acorus*. *l.* ovate-lanceolate, erect. *h.* 2½ft. South America, 1788. (L. B. C. 562.)

C. gigantea (gigantic).* *fl.* large, very ornamental, with orange-red outer, and deep purple red inner segments. Summer. *l.* about 2ft. long; petioles covered with a velvety down. *h.* 6ft. South America, 1788. (B. R. 206.)

C. indica (Indian).* Indian Reed. *fl.* rather large, irregular; spikes erect, with light yellow and carmine-red divisions. Summer. *l.* large, alternate, ovate-lanceolate. *h.* 3ft. to 6ft. West Indies, 1570. See Fig. 359. (B. M. 454.)

C. insignis (magnificent). *fl.* orange-red, few, small. *l.* ovate, spreading horizontally, green, rayed and margined with purplish-red. Stems violet, downy. *h.* 3ft. to 5ft.

C. iridiflora (Iris-flowered). *fl.* rose, with a yellow spot on the lip; spikes slightly drooping, several emanating from the same spathe. Summer. *l.* broadly ovate-acuminate. *h.* 6ft. to

8ft. Peru, 1816. (B. R. 609.)

C. i. hybrida (hybrid). *fl.* blood-red, very large, only properly developed when grown in a greenhouse. *l.* green, very large. Stem green, downy, somewhat reddish. *h.* 6ft. to 8ft.

C. limbata (bordered).* *fl.* yellowish-red, disposed in long loose spikes; spathes glaucous. *l.* oblong-lanceolate, acute. *h.* 3ft. Native country uncertain, 1818. (B. R. 771.)

C. l. major (larger-bordered). *fl.* orange-red, large. *l.* large, lanceolate, 2½ft. long, 8in. wide, spreading, deep green. Stems downy. *h.* 5ft. to 6½ft.

C. nigricans (blackish).* *l.* coppery-red, lanceolate, acuminate, erect, 2½ft. long, 10in. to 12in. broad. Stems purplish-red. *h.* 4½ft. to 8ft. One of the finest kinds. *C. atro-nigricans* has leaves of a purplish shade, passing into dark red, of a deeper hue than those of *C. nigricans*.

C. Premices de Nice. *fl.* bright yellow, very large. Stems and leaves like those of *C. Annæi*.

C. Rendatleri (Rendatler's).* *fl.* salmon-red, numerous, large. *l.* much pointed, deep green, tinged with dark red. Stems purplish-red. *h.* 6ft. to 8ft.



Fig. 360. Flowering Spike of Canna speciosa.

C. speciosa (showy).* *fl.* sessile, in pairs; petals two, erect, bifid; lip spotted, revolute. August. *l.* lanceolate. *h.* 3ft. Nepaul, 1820. See Fig. 360. (B. M. 2317.)

C. Van-Houttei (Van Houtte's).* *fl.*

bright scarlet, large, very abundantly produced. *l.* lanceolate, 2ft. to 2½ft. long, acuminated, green, rayed and margined with dark purplish-red.

C. Warscewiczii (Warscewicz's).* *fl.* with brilliant scarlet inner, and purplish outer segments. *l.* ovate-elliptic, narrowed at both ends, deeply tinged with dark purple. *h.* 3ft. Costa Rica, 1849. (B. H. 2, 48.) There are several varieties of this species, the best two are: *Chatei*, with very large dark red leaves, and *nobilis*, with deep green leaves, rayed and margined with dark red.

C. zebrina (zebra-striped).* *fl.* orange, small. *l.* very large, ovate, erect, deep green, passing into dark red, rayed with violet-purple. Stems dark violet-red. *h.* 6ft. to 8ft.

CANNABINACEÆ. This order, of which the genus *Cannabis* (Hemp) is the type, is now merged into *Urticaceæ*.

CANNABIS (from the Greek word *kannabis*, used by Dioscorides, and that from Sanskrit *canam*). Hemp. ORD. *Urticaceæ*. A small genus, of but little ornamental value. Flowers racemose, diœcious. Nut two-valved, within the closed calyx. The undermentioned species is a hardy annual, of easy culture in ordinary garden soil. Propagated by seeds, sown in spring.

C. sativa (cultivated). *fl.* greenish. June. *l.* on long stalks; leaflets from

five to seven, long, lanceolate, acuminated; margins serrated. *h.* 4ft. to 10ft., or even 20ft. India, &c. This plant is cultivated very extensively for the sake of its valuable fibre. Well-grown plants have rather an ornamental appearance during the summer months. See Fig. 361.

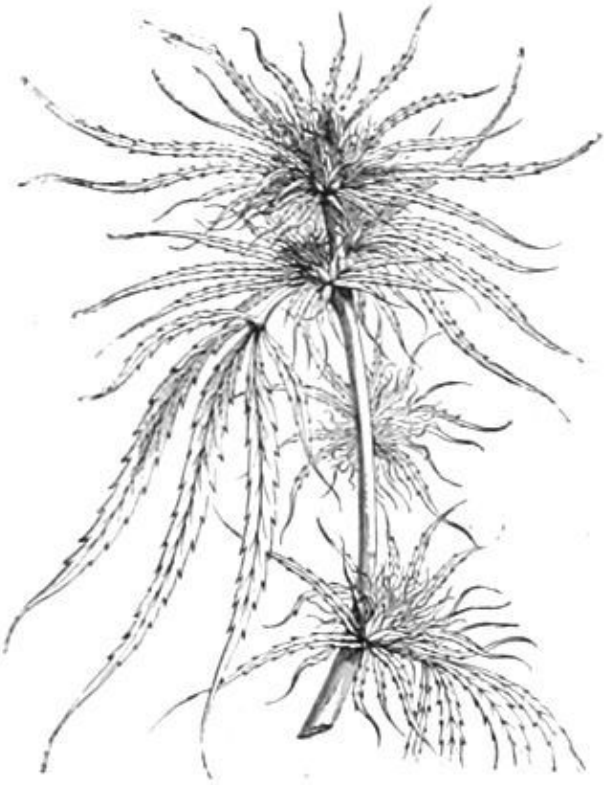


Fig. 361. Head of Cannabis sativa.

CANNON-BALL TREE. A common name for **Couroupita guianensis** (which *see*).

CANSCORA (from *Kansgan-Cora*, the Malabar name of *C. perfoliata*, as yet unintroduced). SYN. *Pladera*. Including *Phyllocyclus*. ORD. *Gentianeæ*. Small, erect, simple or branched, stove or greenhouse annuals. Flowers stalked or sub-sessile. Leaves opposite, sessile or amplexicaul. Corolla funnel-shaped, with a four-cleft, unequal limb; the two outer segments equal, two lower ones combined a greater distance. Stems tetragonal. *C. Parishii* requires similar treatment to **Balsam,** and grows best in a soil to which chalk or limestone débris is added.

> **C. Parishii** (Parish's). *fl.* white. *l.* opposite, perfectly connate, so that the united two apparently form an exactly orbicular leaf. *h.* 2ft. Moulmein, 1864. Greenhouse. (B. M. 5429.)

CANTERBURY BELLS. *See* **Campanula Medium.**

CANTHARELLUS CIBARIUS. *See* **Chantarelle**.

CANTHIUM. A synonym of **Plectronia**.

CANTUA (from *Cantu*, the Peruvian name of one of the species). SYN. *Periphragmos*. ORD. *Polemoniaceæ*. Very pretty erect, branched greenhouse evergreen shrubs. Flowers in corymbs, at the termination of the branches, rarely solitary and axillary. Leaves entire or almost pinnatifid, alternate, petiolate, elliptic, acuminated, or cuneate-oblong, glabrous, or downy on both surfaces when young. They are of easy culture in a compost of turfy loam, leaf-mould, and sand, if good drainage is allowed. Propagated by cuttings, placed in sand, under a hand glass. In the western parts of England, these plants—particularly *C. buxifolia*—thrive remarkably well in sheltered

situations.

C. bicolor (two-coloured). *fl.* solitary; corolla with a short yellow tube and scarlet limb. May. *h.* 4ft. Peru, 1846. (B. M. 4729.)

C. buxifolia (Box-leaved).* *fl.*, corolla pale red, straight, funnel-shaped, with a very long tube; corymbs few-flowered; peduncles tomentose. April. *l.* cuneate-oblong, mucronulate, quite entire. *h.* 4ft. Peruvian Andes, 1849. An elegant plant, having the tops of branches, calyces, and young leaves, downy. SYN. *C. dependens*. See Fig. 362. (B. M. 4582.)

C. dependens (hanging). Synonymous with *C. buxifolia*.

C. pyrifolia (Pyrus-leaved).* *fl.*, corolla yellowish-white, curved; stamens twice as long as the corolla; corymbs terminal, dense-flowered. March. *l.* elliptic or obovate acute, entire or sinuate-dentate. *h.* 3ft. Peru, 1846. (B. M. 4386.)

CAOUTCHOUC. The elastic gummy substance known as indiarubber, which is the inspissated juice of various plants growing in tropical climates in different parts of the world; such as *Castilloa*, *Ficus elastica*, *Hevea*, various species of *Landolphia*, *Manihot*, &c., &c.

CAPE EVERLASTING. *See* **Helichrysum**.

CAPE GOOSEBERRY. *See* **Physalis peruviana**.



Fig. 362. Flowering Branch of Cantua buxifolia.

CAPE GUM. The gum of *Acacia Karroo* or *A. capensis*.

CAPE JESSAMINE. *See* **Gardenia florida**.

CAPER-TREE. *See* **Capparis**.

CAPILLARY. Very slender; resembling a hair.

CAPITATE. Growing in a head.

CAPITULATE. Growing in small heads.

CAPITULUM. A close head of flowers; the

inflorescence of Composites.

CAPPARIDEÆ. An order of herbs or shrubs, rarely trees. Flowers clustered, or solitary; sepals four to eight, imbricate or valvate; petals four, arranged crosswise, sometimes, but rarely, five, or eight, rarely absent. Leaves alternate, very rarely opposite, stipulate or exstipulate. The order is distributed throughout the tropical and warm temperate regions of both hemispheres, the frutescent species being largely represented in America. There are about twenty-three genera—the best-known being *Capparis*, *Cleome*, and *Cratæva*—and about 300 species.

CAPPARIS (*kapparis*, old Greek name used by Dioscorides, from Persian *kabar*, Capers). Caper-tree. ORD. *Capparideæ*. Greenhouse or stove evergreen shrubs, of considerable beauty. Calyx four-parted; petals four; stamens numerous; succeeded by a berry. They thrive best in a compost of well-drained sandy loam. Cuttings of ripe shoots will root in sand, under a hand glass, in moist heat. This genus contains about 120 species, but it is very doubtful if more than six are to be found under cultivation in this country.

C. amygdalina (Almond-like).* *fl.* white; peduncles axillary, compressed, corymbiferous. *l.* elliptical-oblong, narrowed towards both ends, with a callous point; upper surface smooth; under surface, as well as the branches, covered with silvery scaly dots. *h.* 6ft. West Indies, 1818. Stove.

C. cynophallophora (Dog-phallus bearing). *fl.* white, large, fragrant;

peduncles few-flowered, shorter than the leaves. *l.* smooth, leathery, oblong, on short petiole. *h.* 8ft. to 25ft. West Indies, 1752. Stove. (R. G. 1862, 351.)

C. odoratissima (sweetest-scented).* *fl.* violet, sweet-scented, about the size of Myrtle, with yellow anthers; peduncles racemiferous at the top. *l.* oblong, acuminate, on long footstalks; upper surface smooth; under surface covered with little hard scales. *h.* 6ft. Caraccas, 1814. Stove.



Fig. 363. Flower and Bud of Capparis spinosa.

C. spinosa (spiny).* Common Caper. *fl.* white, tinged with red on the outside; pedicels solitary, one-flowered. June. *l.* ovate, roundish, deciduous. *h.* 3ft. South Europe, 1596. This is an excellent greenhouse shrub, and one which we have found perfectly hardy in the southern counties of England. See Fig. 363. (B. M. 291.)

CAPRIFOLIACEÆ. A rather large order of shrubs or herbs, often twining. Flowers terminal, corymbose, or axillary; corolla superior, regular or irregular. Leaves opposite, exstipulate. Well-known genera are: *Linnæa*, *Lonicera*, *Sambucus*, and *Viburnum*.

CAPRIFOLIUM. *See* **Lonicera**.

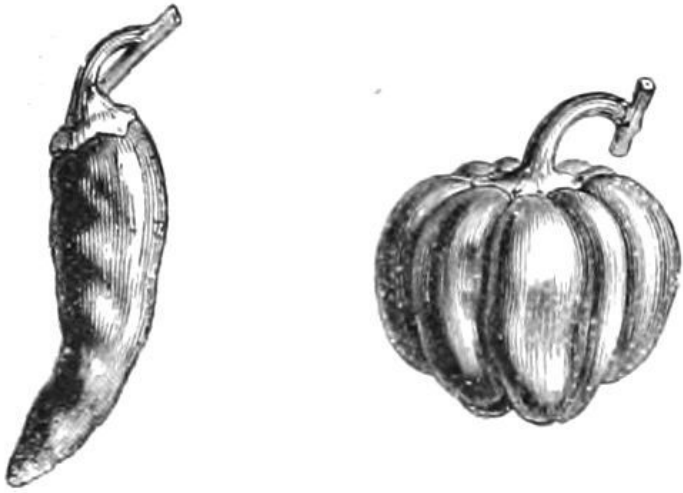


Fig. 364. Fruit of Long and Round Capsicums.

CAPSICUM (from *kapto*, to bite; on account of the biting heat of the seeds and pericarp). Ord. *Solanaceæ*. Shrubs or sub-shrubs, rarely herbs. Peduncles extra-axillary, one-flowered. Leaves scattered, solitary, or twin, and quite entire. Many of the species, although possessing considerable beauty, are but rarely grown, either for decoration or for the use of their fruit; consequently, we confine our specific enumeration to the Common Capsicum, the Bird Pepper or Chili, and the Bell Pepper. The first two of these have long been in cultivation, for use either in a green state for pickles and for making Chili vinegar, or ripened and ground as Cayenne Pepper. Some sorts are exceedingly ornamental for

greenhouse decoration in winter, if plants are well grown in rather small pots, and the fruit ripened under glass. The varieties producing small pods are the hottest, and consequently best suited for making Cayenne Pepper. These are generally called Chilies. All other varieties of Capsicum have a more or less pungent flavour, and those bearing larger pods are more profitable for use in a green state. The fruits of all are either red or yellow when ripe, and are of various sizes and shapes. Some are produced and stand erect on the upper side of the branches; others hang underneath. Fig. 364 represents hanging fruits of Long and Round Capsicums, the shapes of which are produced by both red and yellow varieties.

Cultivation. Being natives of tropical countries, Capsicums cannot always be depended upon to thoroughly ripen in the open air; but a good crop of green fruits may generally be obtained by preparing the plants early in the season, and planting out in a warm situation.

Sow the seeds in February or early in March, in pots or pans, placing them in heat; and so soon as the plants are large enough, pot off singly into 3in. pots, still keeping them in heat until well rooted. Place them into 6in. or 7in. pots before they become starved; and gradually harden off and plant out about 2ft. asunder, in June. The fruits ripen better if the plants are placed against a south wall and tacked on to it. The safest plan to obtain a crop of ripe fruits is to cultivate under glass. Pots of 7in. diameter are large enough. Rich soil must be used, and any spare frames are suitable in summer. Plenty of water and frequent syringings should be applied, as the plants are very liable to injury from red spider and other insects if this is in any way neglected. The fruits will

keep some time after being ripe, but are never better than when fresh gathered; they may, however, be kept on the plants for a considerable period.

Sorts. Chili, Long Red, Long Yellow, Small Red Cayenne, Round Red, and Round Yellow. Good ornamental varieties are: Little Gem, a very dwarf variety, of comparatively recent introduction, covered with small, erect, red pods; and Prince of Wales, free fruiting, with hanging bright yellow pods.

C. annuum (annual). Common Capsicum. *fl.* white, solitary. June. Petioles glabrous. *fr.* oblong, pendulous, and erect, red or yellow, variable in shape. *h.* 1ft. to 2ft. South America, 1548.

C. baccatum. Bird Pepper or Chili. *fl.* greenish; peduncles twin. June. *fr.* small, erect, almost globose. *l.* oblong, glabrous, as well as the petiole. Branches angular, striated. *h.* 2ft. to 4ft. Tropical America, 1731. Greenhouse shrub.

C. grossum (large). Bell Pepper. *fl.* white. July. India, 1759.

CAPSULAR. Like a capsule.

CAPSULE. A dry dehiscent seed vessel or fruit.

CARAGANA (*Caragan* is the name of *C. arborescens* among the Monguls). Siberian Pea-tree. ORD. *Leguminosæ*. Very ornamental hardy deciduous trees or shrubs. Flowers usually yellow, axillary, either solitary or crowded, but always single on thin stalks.

Leaves abruptly pinnate, the midrib ending in a bristle or spine; leaflets mucronate. They are well adapted for shrubberies, and are of the easiest culture in sandy soil. Propagated by cuttings, made of the roots, or by seeds; the low-growing shrubs by seeds and layers. Caraganas are generally increased by grafting on *C. arborescens*, which is easily raised from seed, sown when ripe or in spring.

C. Altagana (Altagana). *fl.* yellow; pedicels solitary. April to July. *l.* with six to eight pairs of glabrous, obovate-roundish, retuse leaflets; petiole unarmed. *h.* 2ft. to 3ft. Dahuria, 1789. Shrub.

C. arborescens (tree-like).* *fl.* pale or bright yellow; pedicels in fascicles. April, May. *l.* with four to six pairs of oval-oblong villous leaflets; petiole unarmed. Stipules spinescent. *h.* 15ft. to 20ft. Siberia, 1752. Tree. (B. M. 1886.)

C. Chamlagu (Chamlagu). *fl.* yellow, at length becoming reddish, large, pendulous; pedicels solitary. May. *l.* with two pairs of distant, oval, or obovate glabrous leaflets; stipules spreading, and, as well as the petioles, spinose. *h.* 2ft. to 4ft. China, 1773. Shrub.

C. frutescens (woody).* *fl.* yellow, resupinate; pedicels solitary. April. *l.* with two pairs of leaflets, approximating the top of the petiole, obovate-cuneated; stipules

membranous; petiole furnished with a short spine at the apex. *h.* 2ft. to 3ft. Siberia, 1752. Shrub. (S. B. F. G. 3, 227.) There are one or two varieties of this species.

C. jubata (bearded).* *fl.* white, suffused with red, few; pedicels solitary, very short. April. *l.* with four or five pairs of oblong-lanceolate, lanuginously-ciliated leaflets; stipules setaceous; petioles somewhat spinose. *h.* 1ft. to 2ft. Siberia, 1796. Shrub. SYN. *Robinia jubata*. (L. B. C. 522.)

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ALPINE GARDEN.
ALPINIA.
ALSODEIA.
ALSOPHILA.
ALSTONIA.
ALSTRÖMERIA.
ALTERNANTHERA.
ALTHÆA.
ALYSSUM.
AMARANTHACEÆ.
AMARANTHUS.
AMARYLLIS.
AMASONIA.
AMBROSINIA.
AMBURY.
AMELANCHIER.
AMELLUS.
AMERICAN BLIGHT.
AMERIMNON.
AMHERSTIA.
AMICIA.
AMMOBIUM.
AMMODENDRON.
AMOMUM.
AMORPHA.
AMORPHOPHALLUS.
AMPELOPSIS.
AMPHICARPÆA.
AMPHICOME.
AMPHILOPHIUM.
AMSONIA.
AMYRIS.
ANACAMPSEROS.
ANACARDIUM.
ANAGALLIS.

ANAGYRIS.
ANANAS.
ANANTHERIX.
ANARRHINUM.
ANASTATICA.
ANCHIETEA.
ANCHOMANES.
ANCHUSA.
ANDERSONIA.
ANDIRA.
ANDROCYMBIUM.
ANDROLEPIS.
ANDROMEDA.
ANDROPOGON.
ANDROSACE.
ANDROSTEPHIUM.
ANDRYALA.
ANEILEMA.
ANEMIA.
ANEMONE.
ANEMONOPSIS.
ANEMOPÆGMA.
ANGELICA.
ANGELONIA.
ANGIOPTERIS.
ANGOPHORA.
ANGRÆCUM.
ANGULOA.
ANGURIA.
ANIGOZANTHUS.
ANISE.
ANISOCHILUS.
ANISOMELES.
ANNUALS.
ANŒCTOCHILUS.
ANONA.

ANOPTERUS.
ANSELLIA.
ANTENNARIA.
ANTHEMIS.
ANTHERICUM.
ANTHOCERCIS.
ANTHOLOMA.
ANTHOLYZA.
ANTHOXANTHUM.
ANTHURIUM.
ANTHYLLIS.
ANTIGONON.
ANTIRRHINUM.
ANTROPHYUM.
ANTS.
AOTUS.
APEIBA.
APHELANDRA.
APHELEXIS.
APHIDES.
APHYLLANTHES.
APICRA.
APIOS.
APLECTRUM.
APOCYNUM.
APONOGETON.
APPLE.
APPLE-BLOSSOM WEEVIL.
APPLE MUSSEL SCALE.
APPLE or CODLIN GRUB.
APRICOT.
AQUATIC PLANTS.
AQUILEGIA.
ARABIS.
ARACEÆ.
ARACHIS.

ARALIA.
ARALIACEÆ.
ARAUCARIA.
ARBOR.
ARBORETUM.
ARBUTUS.
ARCTOSTAPHYLOS.
ARCTOTHECA.
ARCTOTIS.
ARDISIA.
ARDUINA.
ARECA.
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ARENGA.
ARETHUSA.
ARGANIA.
ARGEMONE.
ARGIYREIA.
ARGYROXYPHIUM.
ARISÆMA.
ARISARUM.
ARISTEA.
ARISTOLOCHIA.
ARISTOTELIA.
ARMENIACA.
ARMERIA.
ARNEBIA.
ARNICA.
ARPOPHYLLUM.
ARRACACHA.
ARTABOTRYS.
ARTANEMA.
ARTEMISIA.
ARTHROPODIUM.
ARTHROSTEMMA.
ARTICHOKE, GLOBE.

ARTOCARPUS.
ARUM.
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ARUNDO.
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ASCLEPIAS.
ASCYRUM.
ASHES.
ASIMINA.
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ASPARAGUS.
ASPARAGUS BEETLE.
ASPASIA.
ASPERULA.
ASPHALT.
ASPHODELINE.
ASPHODELUS.
ASPIDISTRA.
ASPIDIUM.
ASPLENIUM.
ASSONIA.
ASTARTEA.
ASTELMA.
ASTEPHANUS.
ASTER.
ASTERACANTHA.
ASTILBE.
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ASTRANTIA.
ASTRAPÆA.
ASTROCARYUM.
ASTROLOMA.
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ATALANTIA.
ATHAMANTA.
ATHANASIA.

ATHRIXIA.
ATHROTAXIS.
ATRAGENE.
ATRIPLEX.
ATTALEA.
AUBERGINE.
AUBRIETIA.
AUCUBA.
AUDOUINIA.
AULAX.
AURICULA.
AVENA.
AVENUES.
AVERRHOA.
AZALEA.
AZARA.

BABIANA.
BABIANA.
BACCHARIS.
BACKHOUSIA.
BACTRIS.
BACULARIA.
BÆRIA.
BALBISIA.
BALCONY.
BALSAM.
BALSAMODENDRON.
BAMBUSA.
BANISTERIA.
BANKSIA.
BAPHIA.
BAPTISIA.
BARBACENIA.
BARBAREA.
BARKERIA.

BARKLYA.
BARLERIA.
BARNADESIA.
BAROSMA.
BARRINGTONIA.
BARTONIA.
BASELLA.
BASKETS.
BASSIA.
BASS. or BAST MATS
BATATAS.
BATEMANNIA.
BAUERA.
BAUHINIA.
BEAN BEETLE.
BEANS.
BEAUCARNEA.
BEAUFORTIA.
BEAUMONTIA.
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CALLISTEMON.
CALLISTEPHUS.
CALLITRIS.
CALLUNA.
CALOCHILUS.
CALOCHORTUS.
CALODENDRON.
CALOPHACA.
CALOPHANES.
CALOPHYLLUM.
CALOPOGON.
CALOSCORDUM.
CALOSTEMMA.
CALOTHAMNUS.
CALOTROPIS.
CALTHA.
CALYCANTHUS.
CALYCOPHYLLUM.
CALYCOTOME.
CALYPSO.
CALYPTRANTHES.
CALYPTROGYNE.
CALYSTEGIA.

CALYTHRIX.
CAMASSIA.
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CAMELLIA.
CAMPANULA.
CAMPANUMÆA.
CAMPHORA.
CAMPTOPUS.
CANARINA.
CANARIUM.
CANAVALIA.
CANBIA.
CANDOLLEA.
CANELLA.
CANISTRUM.
CANKER.
CANNA.
CANNABIS.
CANSCORA.
CANTUA.
CAPPARIS.
CAPSICUM.
CARAGANA.

Transcriber notes:

P. 14. 't rminal' under Aciotis, changed to 'terminal'.

P. 21. 'Ternstroemiaceoe' changed to 'Ternstroemiaceæ'.

P. 27. 'producing fronds', fronds is usually in italics. Changed.

P. 27. 'A synonymn of A. venustum.',

changed 'synonymn' to 'synonym'.

P. 41. 'deeply chanelled', changed 'chanelled' to 'channelled'.

P. 41. 'A. Wislizeni ... which is under 2ft. broad'; should 'broad' be 'long'? Left as a query.

P. 49. A Scorodoprasum. 'Europ' changed to 'Europe'.

P. 53. A. ageratoides. 'receptable" changed to 'receptacle'.

P. 87. 'surface is punctuate', changed 'punctuate' to 'punctuated'.

P. 87. 'of less than than', taken out one 'than'.

P. 134. A. umbrosum. 'laceolate' changed to 'lanceolate'.

P. 162. 'Caraccas', changed to 'Caracas'.

P. 171. 'browish when matured.', changed 'browish' to 'brownish'.

P. 174. 'numerous arge round', changed 'arge' to 'large'.

P. 190. 'part the day' changed to 'part of the day'.

P. 190. 'Rio Janeiro, 1825.' changed to 'Rio de Janeiro, 1825.'

P. 210. 'Caraccas', changed to 'Caracas'.

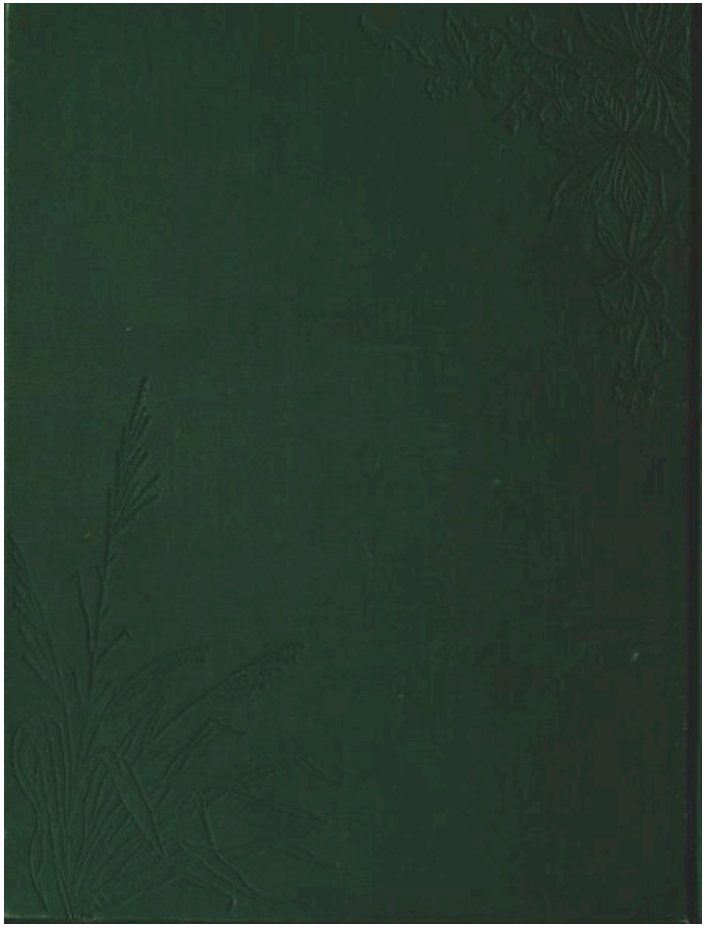
P. 213. 'Syn. B Joinvillei, B. pitcairniæfolia.', changed 'Syn.' to 'Syns.'

P. 222. 'There is a is a variety', removed extra 'is a'.

P. 235. 'petioles sheating' changed to 'petioles sheathing'.

P. 259. 'CAPSIDIUM' is 'CAMPSIDIUM' in another volume. Changed.

Fixed various punctuation.



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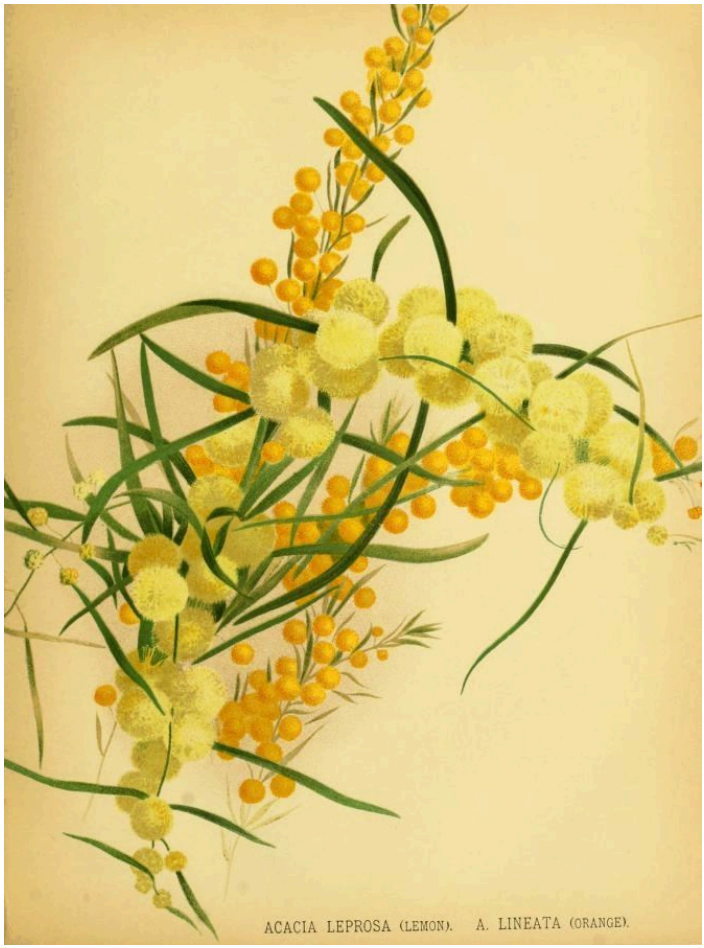
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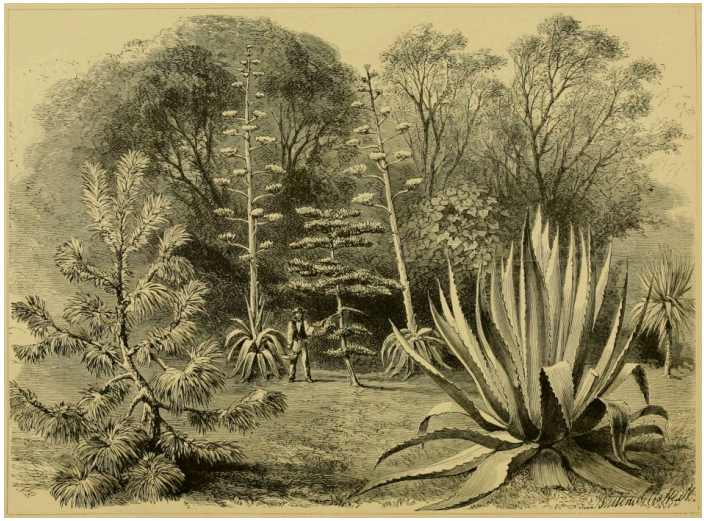
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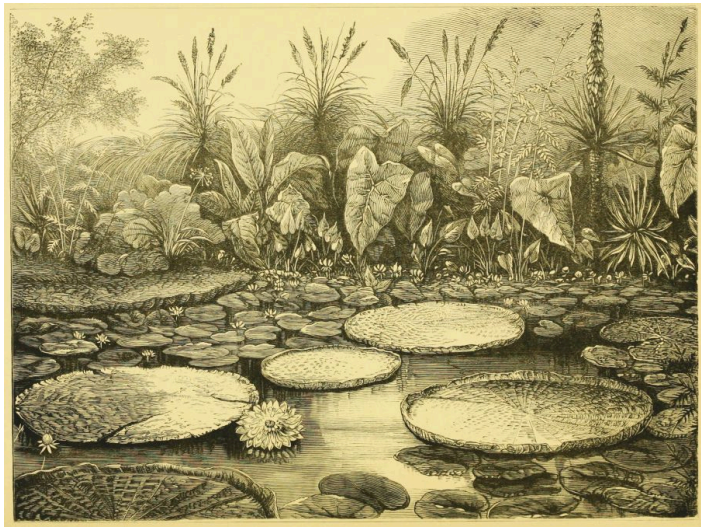
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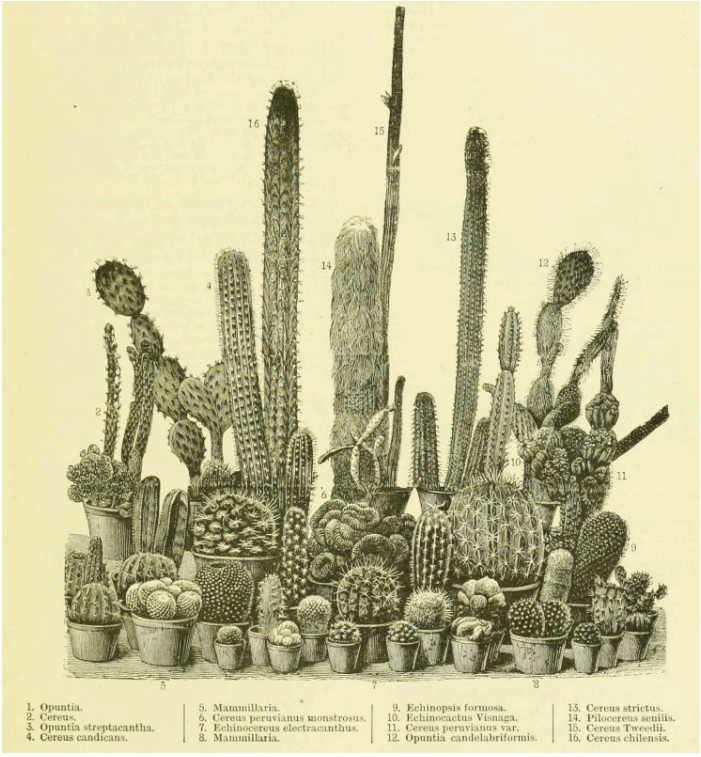
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1. Opuntia.
2. Cereus.
3. Opuntia streptacantha.
4. Cereus candicans.
5. Mammillaria.
6. Cereus peruvianus monstrosus.
7. Echinocereus electracanthus.
8. Mammillaria.
9. Echinopsis formosa.
10. Echinocactus Visnaga.
11. Cereus peruvianus var.
12. Opuntia candelabriformis.
13. Cereus strictus.
14. Pilocereus senilis.
15. Cereus Tweedii.
16. Cereus chilensis.

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