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[Chap. XCI. - Chap. C.]

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CHAP. LXXXVIII.

OF THE HALF-HARDY PLANTS OF THE ORDER MYOPORINÆ.

Myoporum parvifolium R. Br., Bot. Mag., t. 1691., is a native of New Holland, with trailing stems and small white flowers, which are produced in great profusion nearly all the year. A plant against our conservative wall at Bayswater lived four years, producing shoots of 5 ft. or 6 ft. in length in one season, which were most beautifully covered with flowers. The plant grows so rapidly, that we have no doubt it would cover many square yards of wall in a very short period. There are other species of the genus having the same habit of growth, more particularly *M. oppositifolium* R. Br., *M. diffusum* R. Br., and *M. ascendens* R. Br.

CHAP. LXXXIX.

OF THE HALF-HARDY PLANTS BELONGING TO THE ORDER GLOBULARIACEÆ.

Globularia longifolia L.; *G. salicina* Lam., Bot. Reg., t. 659.; and our fig. 1155.; is a native of Madeira, with long, dark green, shining leaves, and white flowers, which are produced in July and August. It was introduced in 1775; and grows to the height of 3 ft. or 4 ft. in pots, and, doubtless, twice that height, or more, against a conservative wall.

G. Alippum L., Gar. Aix, fig. 42., the alypo globularia, is a native of the south of Europe, which has been in cultivation in British gardens since 1640. It is a pretty little evergreen shrub, growing to the height of 2 ft., about Aix and Montpellier; and producing its pale bluish flowers in August and September. Like all the plants from that part of Europe, it is easily protected in British gardens in a cold frame, surrounded by turf walls or litter, and covered with mats during severe frosts. It might, therefore, be readily protected on dry rockwork in a warm situation, or at the base of a conservative wall. There is a variety, *G. A. integrifolium*, a native of the same climate, which is distinguished from the species by having entire leaves.



CHAP. XC.

OF THE HALF-HARDY PLANTS OF THE ORDER PLUMBAGINACEÆ.

Statice monopétala L., Boc. Sic., t. 16., is a native of Sicily, where it grows to the height of 3 ft., and produces its fine bluish purple flowers in July and August. *S. suffruticosa* L. is a native of Siberia, which seldom exceeds 1 ft. in height. Both these species are very suitable for conservative rockwork.

Plumbago capensis Thunb., Bot. Reg., t. 417., is a native of the Cape of Good Hope, with light blue flowers, which it produces in great profusion throughout the summer; and, though it is seldom seen above 5 ft. in height in green-houses, yet we have seen it reach the top of a wall 10 ft. or 12 ft. high, at Bishopstoke Vicarage, in Hampshire. (See Gard. Mag., vol. x. p. 130.)

CHAP. XCI.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER CHENOPODIACEÆ.

THE hardy ligneous species of this order have whitish or glaucous foliage, and small flowers of nearly the same colour: the latter have not a corolla, and are not showy. They are included in three genera; the names and characteristics of which are as follows:—

CHENOPODIUM L. Flowers bisexual. Calyx inferior, with 5 sepals, permanent. Stamens 5, hypogynous; opposite to, and of about the length of, the sepals. Anthers with round lobes. Ovary orbicular, depressed. Ovule, according to the character of the order, 1, and erect. Styles 2, short. Stigmas obtuse. Fruit a utricle, invested by the calyx. Seed lens-shaped. Leaves alternate, generally lobed, bearing a friable, unctuous scurf. Flowers numerous, small, green, in groups that are disposed in leafy spikes or naked panicles; or the flowers solitary, or 2—3 together, in the axils of leaves. (*Smith Eng. Fl.*; *Lindley Nat. Syst. of Bot.*; and observation.)

A. TRIPLEX L. Flowers some bisexual, some female; those of both kinds upon one plant. — Bisexual flower. Calyx inferior, with 5 sepals, permanent. Stamens 5, hypogynous; opposite to, and about as long as, the sepals. Anthers with round lobes. Pistil and fruit much as in the female flower; but, in Britain, in the native species, seeds are scarcely produced from the bisexual flowers. — Female flower. Calyx inferior, deeply divided into two large, flat, equal, or nearly equal, lobes, and so compressed that the lobes have their inner faces approximate; permanent. Ovary compressed. Ovule, according to the character of the order, 1, and erect. Fruit a utricle, invested by the calyx, which is now enlarged. Seed compressed, orbicular. — Leaves alternate or opposite, undivided or jagged, bearing a meal-like scurf. Flowers numerous, small, greenish, in groups that are axillary or disposed in spikes. (*Smith. Eng. Fl.*; *Lindley Nat. Syst. of Bot.*; and observation.)

DIO'TIS Schreb. Flowers unisexual, those of both sexes upon one plant. — Male flower. Calyx inferior, with 4 sepals, permanent. Stamens 4, inserted at the bottom of the calyx; opposite to, and prominent beyond, the sepals. — Female flower. Calyx inferior, of one piece deeply divided, and ending in 2 horns, permanent, and, possibly, adnate to the ovary. Ovule, according to the character of the order, 1, and erect. Fruit a utricle, villos at the base, partly invested by the calyx. — Leaves alternate, lanceolate, entire, bearing hoary pubescence. Male flowers in axillary groups that are disposed in leafy spikes. Female flowers about 2 together, axillary. (*Encycl. of Plants*; *Nuttall Gen.*; *Lindley Nat. Syst. of Bot.*; and observation.)

GENUS I.



CHENOPODIUM L. THE GOOSEFOOT. *Lin. Syst. Pentandria Digynia.*

Identification. *Lin. Gen.*, 121., but with some modification since.

Synonymes. *Salsola, Sp.*; *Anserine, Fr.*; *Gause Fuss, Ger.*

Derivation. From the Greek words *chên*, a goose, and *pous podos*, foot; many of the species having large angular leaves extremely like the webbed foot of a waterfowl.

Description, &c. A genus of which there are only three ligneous species in British gardens: two of these formerly belonged to the genus *Salsola*, or saltwort; and, like the other plants of that genus, they contain a large proportion of soda, more especially in their native habitats, near the sea. The plants are of the easiest culture in any dry soil; and they are readily propagated by cuttings.

★ **I. C. FRUTICOSUM Schrad.** The shrubby Goosefoot, or *Stonecrop Tree*.

Identification. Schrad., according to G. Don in *Hort. Brit.*

Synonymes. *Salsola fruticosa Lin. Sp. Pl.*, 324., *Willd. Sp. Pl.*, 1. p. 1316., *Eng. Bot.*, t. 635., *Fl. Græc.*, t. 255., *Eng. Flora*, 2. p. 18., *N. Du Ham.*, 6. p. 263.; the shrubby Glasswort; *Soude en Arbre, Fr.*; *strauchartiges Salzkraut, Ger.*

Engravings. *Eng. Bot.*, t. 635.; *Flor. Græc.*, t. 255.; *N. Du Ham.*, 6. t. 79.; and our *figs.* 1156, 1157.

Spec. Char., &c. Shrubby, upright, evergreen. Leaves semicylindrical, bluish, imbricate. (*Smith Eng. Fl.*, and *Willd. Sp. Pl.*) This species is a low shrub, seldom exceeding 3 ft. or 4 ft. in height, with numerous cylindrical upright branches; and sessile, linear, fleshy, and alternate leaves, which are



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glabrous, and flat on their upper surface, of a very glaucous green, and placed very near each other. The flowers are small, greenish, and axillary; usually solitary. The stamens are generally longer than the divisions of the calyx; and the styles, which are 2—3 in number, are reddish. It is found wild on the shores of the Mediterranean, both in Europe and Africa; and on the sea coasts in England. It is perfectly hardy; and, even when killed down to the ground by severe frost in winter, it is sure to throw up fresh shoots in spring. It is not very ornamental, but is useful, in some situations, as a glaucous evergreen bush. It may be propagated by seeds, layers, cuttings, or suckers. It

should be planted in a sheltered situation, as it is an evergreen, and the leaves, from their succulency are easily affected by the frost, which turns them black. The branches are very brittle, and apt to break off: they should not, however, be tied up closely, as the leaves will rot if they are not allowed abundance of light and air.

■ 2. *C. PARVIFOLIUM* R. et S. The small-leaved Goosefoot.

Identification. Rœm. et Schult. Syst. Veg., 6. p. 266.

Synonymes. *C. fruticosum* Bieb. in *Fl. Taur.-Cauc.*, 1. p. 181., exclusively of all the synonymes; *C. microphyllum* Bieb. in *Suppl. to Fl. Taur.-Cauc.*, 1. p. 275.; *Salsola fruticosa* Bieb. *Casp.*, p. 149. App. No. 22., *Pall. It.*, 3. p. 524.; *Suaeda microphylla* *Pall. Illust.*, 3. t. 44.

Engraving. *Pall. Ill.*, 3. t. 44.

Description, &c. Imperfectly evergreen, frutescent, much branched, spreading, glabrous, about 2 ft. high. Leaves taper, oblong, obtuse, glaucous, fleshy; the lower half an inch long, the floral ones shorter. Flowers of the shape of those of *C. maritimum*, three together, attached to the petiole above its base, not bracteated. The sepals that attend the fruit are equal and convex at the back. (Zieb.) Frequent in the plains of Eastern Caucasus, towards the Caspian Sea, and near the salt river Gorkaja, where it is believed to be deleterious to horses. (*R. et S. Syst. Vég.*) It was introduced into England in 1825, but is very seldom found in collections.

■ 3. *C. HORTE'NSE* R. et S. The Garden Goosefoot.

Identification. Rœm. et Schult. Syst. Veg., 6. p. 268.

Synonymes. *Suaeda hortensis* Forsk. *Ægypt. Arab.*, p. 71.; *Delile Descr. de l'Égypte*, No. 297.; *Salsola divergens* *Poir. Enc. Meth.*, 7. p. 299.

Description, &c. Subevergreen. A shrub, about 2 ft. high, very diffuse. Stem, branches, and leaves spotted with white, having upon their surface a mealy matter that may be rubbed off. Leaves flat above, linear, fleshy. Flowers axillary, sessile, in groups. Stigmas 3, united at the base. Calyx, as it attends the fruit, fleshy, diverging. It is very similar to, if not identical with, *Salsola trigyna* Cav. (*R. et S. Syst. Vég.*) A low uninteresting shrub, a native of Asia, and the south of Europe, supposed to be in British gardens; but we are not certain that we have seen the plant.

GENUS II.



A'TRIPLEX L. THE ORACHE. *Lin. Syst. Polygãmia Monœ'cia.*

Identification. *Lin. Gen.*, 745.; *Eng. Flor.*, 4. p. 255.

Derivation. From *ater*, black; according to some by antiphrasis, in reference to the whitish, or mealy, hue of the plants.

Description, &c. Shrubs, with imperfectly woody branches, and succulent leaves, white or glaucous from being covered with a mealy powder. Natives of Britain or the south of Europe, of easy culture and propagation in any common garden soil.

■ 1. *A. HALIMUS* L. The Halimus Orache, or Tree Purslane.

Identification. *Lin. Hort. Cliff.*, 469.; *Gron. Virg.*, 195.; *Roy. Lugd.*, 218.; *Mill. Dict.*, No. 2., *Pall. It.*, 1.; *Append. It.*, 2. p. 477.; *Lodd. Cat.*, ed. 1836.

Synonymes. *Halimus latifolius* sive *fruticosus* *Bauh. Pin.*, 120., *Ger. Emac.*, p. 522.; *Halimus i. Ctus. Hist.*, 1. p. 53.; the broad-leaved Sea Purslane Tree; *Arroche, Fr.*; *strauchartige Melde, Ger. Engravings.* *Park. Theatr.*, 724. t. 2.; *Ger. Emac.*, p. 522. f. 1.; and our *fig.* 1158.

Spec. Char., &c. Stem shrubby. Leaves alternate or opposite, their figure partaking of an oblong and a rhomb, entire. (*Willd.*) It inhabits hedges on the coast of Spain, Portugal, Virginia, and Siberia; and was introduced in 1640. An evergreen shrub, which grows about 5 ft. or 6 ft. high, and forms a large broad head. The young branches are covered with a smooth white bark, which becomes grey, and peels off lengthwise, as the tree gets old. The branches are very brittle, and have but little pith. The leaves are soft, white, and silvery, and, in shape, resemble the Greek Δ . The shrub seldom flowers in Britain; but, from its not being quite deciduous, and from the silvery hue of its foliage, it is a valuable plant for shrubberies and other ornamental plantations. It may be propagated by cuttings made in the usual manner, but carefully protected from sparrows, which are so fond of the leaves of this shrub, that "when they once find them out, they will never leave or forsake them, until they have entirely stripped the plants; and though the shrub will shoot out afresh, yet they will as constantly repair to their repast; and will thus continue to prey upon them, until they have entirely destroyed them." (See *Marshall on Planting and Rural Ornament*, vol. ii. p. 29.) It requires a sheltered situation, being liable to injury from frost. Price of plants, in the London nurseries, 1s. 6d. each.



2. 2. *A. PORTULACÖIDES L.* The Purslane-like, or shrubby, Orache, or Sea Purslane.

Identification. Lin. Fl. Suec., 828. 919.; Mill. Diet., No. 3.; Willd. Sp. Pl., 4. p. 957.; Smith Eng. Flor., 4. p. 256.

Synonymes. *Hálimus secundus Clus. Hist.*, 54. f.; *H. vulgaris Ger. Emac.*, 523. f.; *Hálimus seu Portulaca marina Bauh. Pin.*, 120.; *A'triplex maritima, Hálimus et Portulaca marina dicta, angustifolia, Raii Syn.*, 153.; the narrow-leaved Sea Purslane Tree.

Engravings. Eng. Bot., t. 231.; and our fig. 1159.

Spec. Char., &c. Stem shrubby, spreading. Leaves opposite, obovate-lanceolate, entire. Flowers generally unisexual; those of both sexes upon one plant. (*Smith Eng. Flor.*) It inhabits the northern shores of Europe; and, in Britain and Ireland, is occasionally found in muddy places by the sea side. It is a low shrub, or trailer, with less silvery leaves than those of the preceding species; the whole plant, also, is much smaller. It may be grown in the open garden, or in pots among alpine. The name of *Hálimus*, given to this and the preceding species by *Clusius*, has probably been the source of the epithet *halimifolia*, applied to several other plants; so that *Bácccharis halimifolia, &c.*, means that the leaves are glaucous, and resembling those of certain kinds of *A'triplex*.



GENUS III.



DIO'TIS Schreb. THE DIOTIS. Lin. Syst. Monö'cia Tetrándria.

Identification. Lin. Gen. Pl., ed. Schreber, No. 1423.; Willd. Sp. Pl., 4. p. 368.; Nutt. Gen. and Cat. N. Amer. Pl., 2. p. 207. It is not the *Dibotis* of Desf. Fl. Atl.; Dec. Fl. Fr.; Smith Eng. Flor., 3. p. 402.; which is the *Otántbus* of Link Enum., and the *Santolina maritima L.*

Synonymes. *Ceratöides Tourn.*; *A'xyris Lin.*; *Ceratospérnum Pers.*

Derivation. From *dis*, twice, and *ous*, *ōtos*, an ear. The calyx of the female flower ends in two segments, which fancy may compare to ears, although they more resemble horns: and this second idea is doubtless that referred to in Tournefort's generic name *Ceratoides*, from *keras*, a horn, gen. *keratos*, and *eidos*, likeness.

α I. D. CERATOIDES W. The two-horned-calyxed Diotis.

Identification. Willd. Sp. Pl., 4. p. 368.

Synonymes. *Axyris Ceratoides* Lin. Sp. Pl., 1389; Jacq. Icon. Rar., 1. t. 189; *Ceratospérum papposum* Pers.; *Axyris fruticosa*, floribus foemineis lanatis, Gmel. Sib., 3. p. 17. No. 10. t. 2. f. 1.; *Achyranthes papposa* Forsk. Descr., 48; *Krascheninnikovia* Gueldenst. Act. Petrop., 16. p. 548. t. 17.; *Urtica foliis lanceolatis, femininis hirsutis*, Roy. Lugdb., 210; *Ceratoides orientalis fruticosa* Eleagni folio Town. Cor., 52.; *Orientalisches Doppelohr*, Ger. *Engravings.* Jacq. I. c. Rar., 1. t. 189; Gmel. Sib., 3. p. 17. No. 10. t. 2. f. 1.; Act. Petrop., 16. t. 17.; and our fig. 1160.

Description, &c. A shrub, a native of Siberia and Tartary. Introduced in 1780, and producing its obscure apetalous flowers in March and April. It grows 2 ft. or more high, much more across, and abounds in slender spreading branches. Its leaves are lanceolate, narrow, and alternate. The whole plant is hoary. The male flowers are very abundant, and disposed mostly in approximate axillary groups about the terminal part of the branches. The female flowers are less numerous, and mostly upon a lower part of the branch, axillary, and generally two in an axil. Both male and female flowers are sessile, or nearly so. The female flowers are not obvious. The male flowers are not showy; though their number, grouped character, and the yellow anthers prominent from them, render the flowering of the shrub obvious. They have a slight scent of a honey-like sweetness. The stocky part of this plant is persistently ligneous. *D. Ceratoides* thrives in a light soil, and is easily propagated by layers, or by cuttings inserted in the soil and kept covered with a hand-glass. Plants in the Cambridge Botanic Garden, in August, 1836, growing, some in calcareous soil, and one or more in heath mould, were about 2 ft. high, and with widely spreading recumbent branches. This shrub, therefore, appears particularly well adapted for rockwork; and, if gardens were laid out with a view to the geographical or topographical distribution of plants, the *D. Ceratoides*, with the different species of *Nitraria*, *Calligonum*, &c., would form suitable species for the rockwork of Siberia.



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α *D. lanata* Pursh Fl. Amer. Sept., 2. p. 602.; Nutt. Gen. N. Amer., 2. p. 207., resembles *D. Ceratoides*, but is easily distinguished, at first sight, by the long, woolly, white tomentum which pervades all its parts. The stem is zigzag. The groups of flowers are so crowded as to produce the resemblance of spikes.

App. I. Half-hardy Species of Chenopodiææ.

Anábasis tamariscifolia L., Cav. Ic., 3. 293., is a curious little salsola-like plant, a native of Spain, where it grows 2 ft. high. It was introduced in 1752; but, being of little interest, except to the botanist, it is rarely to be met with even in botanic gardens. *A. aphylla* L., *Salsola articulata* Forst., is another plant of the same genus, a native of Asia Minor.

Kochia prostrata Schr., Jacq. Au., 3. 294.; *Salsola prostrata* L.; is a native of the south of Europe, growing to the height of 5 ft., with the general habit of a salsola. It is almost sufficiently hardy to stand in the open air without protection. A plant in the Cambridge Botanic Garden, in a partly open border, is a freely growing shrub, about 5 ft. high, with its lower branches prostrate, and its upper ones drooping. It is clothed with abundance of narrow, pointed, pubescent leaves, which are a little caescent.

Bœsa Yervandra L., Walt. Hort., 24. t. 10., *Encyc. of Plants*, f. 3453., is a native of the Canaries, where it grows to the height of 8 ft. or 10 ft. A plant in the Horticultural Society's Garden has stood out since 1854, against a wall. It is generally killed to the ground during winter, but grows up again vigorously during summer, and usually reaches from 5 ft. to 6 ft. high.

Camphorosma monspeliaca Schk. Hand., 1. t. 26., is a low heath-like shrub, a native of the south of Europe, common in various places in France; for instance, at Avignon, on the ruins of the old castle. It is of a decumbent habit, with red bark to its young shoots, and with hairy narrow-pointed leaves, in groups along the branches. It is a most desirable plant for conservative rockwork; and if trained against a wall, we have no doubt it would cover several square yards of wall in a very short time.

Other Genera belonging to *Chenopodiææ* contain species which may be reckoned half-hardy; but as they may be readily found by turning to the enumeration in our *Hortus Britannicus*, we do not give them here.

CHAP. XCII.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER POLYGONACEÆ.

DISTINCTIVE Characteristics. Leaves alternate. A filmy cylindrical sheath, called an ochrea (which signifies a boot), arises from the base of every leaf, except in three genera, and surrounds the stem or branch for more or less of the interval between that leaf and the next above it. Generally speaking, this is sufficient to distinguish the Polygonaceæ from all other plants. Additionally, they have an erect ovule, with a superior radicle, and, in most, farinaceous albumen. (*Lindley Nat. Syst. of Bot.*) The hardy ligneous species are included in the three genera, *Tragopyrum Bieb.*, *Atraphaxis L.*, and *Calligonum L.*; which have the following characters.

TRAGOPYRUM Bieb. Calyx inferior, with 5 sepals, that are imbricate in æstivation, permanent; the 2 exterior smaller, the 3 interior investing the fruit, which is an achenium that is 3-cornered in a transverse section of it. Stamens 8. Styles 3. Undershrubs, with the habit of *Atraphaxis*, but decumbent or trailing; and the leaves of one of the species, at least (*T. buxifolium Bieb.*), are deciduous. In the stamens and pistil they resemble *Polygonum*, and in the calyx *Rumex*. (*Bieb. Fl. Taur-Cauc.*, iii. p. 284.; *Lindley Nat. Syst. of Bot.*; and observation.) Pedicels jointed in *T. lanceolatum Bieb.* and *T. polygamum Spr. (Vent.)*

ATRAPHA'XIS L. Calyx inferior, of 4 leaves, in an outer smaller pair and an interior pair, the latter resembling petals; or 4-parted, with the lobes equal. Stamens 6. Stigmas 2, in one species; style bifid, in the other. Fruit compressed, in one species; roundish, in the other. Seed 1. — Species 2. Small shrubs, with leaves more or less ovate. (*Willd. Sp. Pl.*, 2. p. 248, 249., and obs.)

CALLIGONUM L. Calyx inferior, persistent, turbinate in the lower part, ending upwards in a 5-parted spreading border; the 2 outer lobes rather the smaller. Stamens about 16; the filaments slightly united at the base, and then diverging. Anthers peltate. Germen 4-sided, acuminate. Styles 4 or 3, united at the base for a little way, slender, spreading. Stigmas capitate. Fruit an achenium that has 4 sides and 4 wings; and the wings are either membranous, longitudinally 2-parted, toothed, and curled, or rough with branched bristles. *C. Pallasi*, the best-known species, is an erect shrub 3 ft. or 4 ft. high, with rush-like shoots, without obvious leaves, with the flowers in groups, and their calyxes partly white. (*L'Héritier in Lin. Soc. Trans.*, i. p. 177.; and *Rees's Cyclop.*)

GENUS I.



TRAGOPYRUM Bieb. THE GOAT WHEAT. *Lin. Syst.* Octándria Trigýnia.

Identification. Bieb. Flor. Taurico-Caucas., 3 p. 284.

Synonyme. *Polygonum Lin. Hort. Ups.*, 95., *Willd. Sp.*, 2. p. 440., *Bot. Mag.*, t. 1055., *Bot. Reg.* t. 255.

Derivation. *Tragos*, a goat, and *uros*, wheat. The 3-cornered fruits of such of the Polygonaceæ as have them are comparable, with some allowance, to wheat; and goats may feed upon those of the *Tragopyrum*, or upon the shrubs themselves; or it may be that the name has been invented as one readily distinctive from the name *Fagopyrum*, now the name of a genus that includes the different kinds of buck-wheat.

♂ ♀ 1. **T. LANCEOLATUM Bieb.** The lanceolate-leaved Goat Wheat.

Identification. Bieb. Fl. Taurico-Caucas.

Synonymes. *Polygonum frutescens Willd. Sp. Pl.*, 2. p. 440., *Willd. Baumz.*, p. 286., *Bot. Reg.*, t. 254.; *strauchartiger Knöterig, Ger.*

Engravings. *Gmel. Sib.*, 3. t. 12. f. 2.; *Bot. Reg.*, t. 254.; and our fig. 1161.

Spec. Char., &c. Stem spreading widely.

Leaves lanceolate, tapered to both ends, flat. Ochrea lanceolate, shorter than the internode. The 2 exterior sepals reflexed, the 3 interior ones obcordate. Flowers octandrous, trigynous. A native of Siberia and Dahuria. (*Willd.*) A shrub, a native of Siberia, growing from 1 ft. to more than 2 ft. high, branchy, even to the base. Introduced in 1770, but rare in collections. Branches twiggy. Leaf with a frosty hue, spatulate-lanceolate, nearly 1 in. long, several times longer than broad; its edge obscurely indented. The petiole short. The ochrea ends in 2 acuminate points. The flowers are borne on terminal twigs, are pediceled, erect, axillary, 1—3 in an axil, often 3, and are so disposed as



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to constitute leafy racemes. The calyxes are whitish, variegated with rose colour, and persistent; and of the 5 sepals to each flower, the 3 that invest the ovary after the flowering become more entirely rosy. The pedicels, erect while bearing the flower, after the flowering become deflexed, and render the fruit pendulous. (*Bot. Reg.*) There is a plant in the Horticultural Society's Garden, in an unfavourable situation, being much shaded by trees, which is upward of 1 ft. in height; and there is one in the arboretum of Messrs. Loddiges, which forms a hemispherical bush $2\frac{1}{2}$ ft. high; which, during great part of July and August, 1836, was covered with its beautiful white flowers, tinged with pink; and formed a truly admirable object. It thrives best in peat soil, and is worthy of a prominent place in the most select collections.

* 2. *T. BUXIFOLIUM* *Bieb.* The Box-leaved Goat Wheat.

Identification. Bieb. Fl. Taurico-Caucas.

Synonymes. *Polygonum crispulum* var. α *Sims Bot. Mag.*, t. 1065.; *P. caucasicum Hoffmannsegg.*

Engravings. *Bot. Mag.*, t. 1065.; and our fig. 1162.

Spec. Char., &c. Leaf obovate, obtuse, tipped with a short mucro; the lateral margins undulated and reflexed, glabrous. Ochreas with 2 awns. (*Sims in Bot. Mag.*, t. 1065.) A shrub, a native of Siberia. Introduced in 1800, and flowering in July. Its decumbent branches will extend 2 ft. and upwards on every side of the root; their bark is ash-coloured. The leaves are of a light green colour, rather rounded in outline, about 1 in. in diameter, and deciduous. The flowers are produced in long racemes, are nodding, and white. The fruit is enclosed by the 3 inner sepals, which become, as the fruit ripens, of a rosy colour. This, and the preceding



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species, are extremely interesting and beautiful little shrubs, and it is much to be regretted that they are so very seldom seen in collections. Though they require heath soil, and some little time to be firmly established, yet when once they are so, from their compact neat habit of growth, very little care will be necessary afterwards. They never can require much pruning, are quite hardy; and, provided the soil be not allowed to get too dry in the heat of summer, they are always certain of flowering freely. We hope in due time to see our provincial horticultural societies encouraging the growth of plants of this kind, by offering premiums for well grown specimens; and for those who collect the greatest number of sorts.

* 3. *T. POLYGAMUM* *Spr.* The polygamous-sexed Goat Wheat.

Identification. Spreng. Syst. Veg., 2. p. 251.

Synonymes. *Polygonum polygamum* *Vent. Cels.*, t. 65.; *P. parvifolium* *Nutt. Gen.*, 1. p. 256.

Engravings. *Vent. Cels.*, t. 65.; and our fig. 1163.

Spec. Char., &c. Leaves spatulate-linear. Ochreas lanceolate, shorter than the internodes. Flowers in branched racemes, whose rachises are thread-shaped. Styles distinct. A native of dry sandy wastes in Carolina. Introduced in 1810, and flowers in July and August. (*Spreng.*) *T. polygamum Spr.* differs from *T. lanceolatum Bieb.*, especially in the following points: stem very much branched; leaf spatulate; sexes polygamous; sepals expanded during the flowering; and ochreas entire at the top. The polygamous condition of the sexes consists in the flowers of a shrub less than 1 ft. high. Its stem is upright, of the thickness of a raven's quill, cylindrical, and bears in its upper part numerous slender ramified branches, that are disposed so as to form a bushy head. The stem, branches, and branchlets are of a brown colour, and all bear ochreas of this colour, and that are striated, membranous at the tip, truncate on one side, and end lanceolately on the other. The leaves are spatulate, reflexed, glabrous, less than half an inch long, a fourth of their length broad, and of a delicate green colour. The flowers are small, of a greenish white colour, disposed in racemes that are axillary and terminal; and they together give the appearance of a globose panicle. The rachis of the raceme bears ochreas. The pedicels have each a joint. (*Vent. Cels.*) We have not seen the plant. In *fig. 1163. a* is a stamen, *b* the pistil, and *c* the bisexual flower.

T. pingens Bieb., *T. glandicum Spr.*, *T. grandiflorum Bieb.*, are described by botanists, but not yet introduced.



GENUS III.



ATRAPHA'XIS L. THE ATRAPHAXIS. *Lin. Syst.* Hexándria Digýnia.

Identification. Schreb. *Lin. Gen.*, No. 612; Willd. *Sp. Pl.*, 2. p. 248.

Derivation. According to some from a privative, and *traphax*, to nourish; in allusion to the fruit, which, though in form like that of the buck wheat, is unfit for food; according to others, *para to athroos auxein*, from its coming up quickly from seed, viz. on the eighth day.

§ I. *A. SPINOSA L.* The spine-branched *Atraphaxis*.

Identification. *Lin. Hort. Cliff.*, 138; *Mill. Dict.*, No. 1; *L'Hérit. Stirp. Nov.*, 1. p. 27. t. 14; Willd. *Sp. Pl.*, 2. p. 248; *Wats. Dend. Brit.*, t. 119.

Synonymy. *A. triplex orientalis, frutex aculeatus, flore pálcro, Tournef. Cor.*, 83. *Engravings.* *L'Hérit. Stirp. Nov.*, 1. t. 14; *Buxb. Cent.*, 1. t. 30; *Dill. Elth.*, t. 40. f. 47; *Wats. Dend. Brit.*, t. 119; and our *fig. 1164*.

Spec. Char., &c. Some of its branches resemble spines, and this character distinguishes it from the other species, *A. undulata*, and is implied in the epithet *spinosa*. In the following description, most of its characters are noted:—A shrub, of about 2 ft. high, upright, with most of the branches directed upwards, but with some horizontal, and some a little deflexed. The horizontal and deflexed ones are the shorter, and, when leafless, have the appearance of spines. Watson has attributed (*Dend. Brit.*) this to their tips being dead: and the case seems to be so. The bark of the year is whitish; that of older parts is brown. The foliage is glaucous. The flowers are white. The leaves are about half an inch long, many less. The disk ovate-acute; the petiole short. The flowers are borne a few together about the tips of shoots of the year; each is situate upon a slender pedicel, that has a joint about or below the middle, and arises from the axil of a bractea. The calyx is of 4 leaves that are imbricate in æstivation. The 2 exterior are smaller, opposite, and become reflexed. The 2 interior are opposite, petal-like, horizontal during the flowering, afterwards approximate to the ovary, which is flat, and has one of the approximate sepals against each of its flat sides. Stigmas 2, capitate. Stamens connate at the base, into a short disk that surrounds the base of the ovary. (*Observation, and Willd. Sp. Pl.*, and *Wats. Dend. Brit.*) Indigenous near the Caspian Sea, and in the Levant, and flowering in August. It was introduced in 1732, but is rare in collections. There is a fine plant in the arboretum of Messrs.



Loddiges, upwards of 2 ft. high, which was profusely covered with white flowers, tinged with pink, in August, 1836. It frequently ripens seeds there; but no plants have hitherto been raised from them. There is also a plant in the Chelsea Botanic Garden. It thrives best in sandy peat, and is propagated by layers. So elegant and rare a plant deserves a place in every choice collection.

2. *A. UNDULATA* L. The waved-leaved *Atraphaxis*.

Identification. Lin. Hort. Cliff., 137.; Willd. Sp. Pl., 2. p. 249.
Engraving. Dill. Elth., t. 32. f. 36.

Spec. Char., &c. It is less rigid than the *A. spinosa*, and has not a spiny character. Its leaves are ovate, waved at the edges, and of a greener hue. The calyx is 4-parted, and has the lobes equal, ovate, and concave. Stamens lanceolate. Style bifid. Fruit roundish. (Observation, and *Willd. Sp. Pl.*) A native of the Cape of Good Hope, whence it was introduced in 1732, but is rare in collections. In British green-houses, it flowers in June and July; and, when planted out in the open garden, it will produce shoots from subterraneous stolons. We have not seen the plant.

GENUS IV.



CALLIGONUM L. THE CALLIGONUM. *Lin. Syst.* Dodecándria Tetragýnia.

Identification. Lin. Gen., 680.; L'Héritier in Lin. Soc. Trans., 1. p. 177.; Willd. Sp. Pl., 2. p. 926.

Synonymes. *Pallásia* L., *Pterococcus* Pall.

Derivation. *Kallos*, beauty, *gonu*, a knee; in description of the neat and jointed character of the branches.

1. *C. PALLASIA* L'Herit. Pallas's Calligonum.

Identification. L'Hérit. Stirp., 2. p. 37., and in Lin. Soc. Trans., 1. p. 177.; Ait. Hort. Kew., 2. p. 242.; Willd. Sp. Pl., 2. p. 927.

Synonymes. *Pterococcus aphyllus* Pall. *Voy.*, 2. p. 738. t. 8.; *Calligonum polygonoides* Pall. *Itin.*, 3. p. 536.; *Pallásia cáspica* Lin. *fl. Suppl.*, 252., *Savigny* in *Encycl.*; *Pallásia Pterococcus* Pall. *Fl. Ross.*, 2. p. 70. t. 77, 78.; *Caspischer Hackenknopf*, *Ger.*

Engravings. Lam. Ill., 410.; Pall. *Itin.*, 2. t. 81.; Pall. *Fl. Ross.*, 2. t. 77, 78.; and our figs. 1165, 1166.

Spec. Char., &c. Fruit winged: wings membranous, curled, and toothed. (L'Hérit. in *Lin. Soc. Trans.*) A shrub, 3 ft. or 4 ft. high. Introduced in 1780, but rare in collections. In its native state, on the banks of the Caspian Sea, its root is thick, woody, 1½ in. in diameter, striking deep into the sand, with a tuberose head. Stems numerous, about the thickness of a

finger, erect, branched, spreading, dichotomous, brittle, with a grey striated bark. Branches alternate, round, zigzag, pointed, a little knotty; without leaves; putting out every spring, at each joint, from 6 to 10 close-set, herbaceous, rush-like shoots, sometimes simple, sometimes branched, of a fine green and nearly glaucous colour; a few of which survive the winter, and harden into branches; the rest perish and leave a knotty scar. Stipule membranous, obscurely trifid, shriveling, surrounding the joint, as in the polygonums. Leaves alternate, sessile, solitary, at each joint of the herbaceous

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shoots; round, awl-shaped, fleshy, resembling the shoots; half an inch long. Pallas says there are no leaves; but L'Héritier affirms they were actually present in plants cultivated by himself, which were bearing flowers and fruit. Flowers numerous, in clusters, 3-5 in a cluster, lateral, or axillary within the stipules, on the young or woody branches, as well as on the herbaceous shoots; white, with a greenish tinge in the middle. Stamens 16, the length of the calyx, and withering with it as the fruit increases, without falling off. Filaments bristle-shaped, thickest at the base, downy. Anthers nearly globular, 2-celled. Ovary conical, 4-sided, rarely 3-sided, the bifid angles prolonged so as to form the wings of the fruit. Wings somewhat oval, of a crimson colour, striated, and split on the edges, spreading on each side so as to conceal the nut. Pallas describes this plant as a singular shrub, growing plentifully in the Desert of Naryn, and in the sandy tracts between the rivers Rhyrnus and Wolga, lying towards the Caspian Sea, where it frequently covers whole hills: the branches attaining the height of a man, and the roots often descending upwards of 6 ft. into the sand. It abounds on gravelly hills near the Wolga, at Astracan, and near the mouths of the Cama, in the deserts of Tartary. The thick part of the root being cut across in the winter season, a gum exudes, having the appearance of tragacanth. Infused in water, it swells, and is changed into a sweetish mucilage, which does not soon grow dry; and, if exposed to heat, ferments in a few days, and acquires a vinous flavour. The wandering tribes form tobacco-pipes and spoons from the knots found upon the trunk. The smoke of the wood is said to be good for sore eyes. The fruit is succulent, acid, and excellent for quenching thirst. The flowers are produced in May, and the fruit forth, and suddenly spring up, in one night, 1 in. in length, and thread-like and decumbent; but they become speedily erect.

C. comdensum L'Hérit. in Lin. Trans., 1. p. 180, Willd. Sp. Pl., 2. p. 927; and *C. Pánderi* L'Hérit.; are described by botanists, and registered in Sweet's *Hortus Britannicus* as introduced; but we are not aware of their being in the country.

App. I. Half-hardy Species of Polygonaceæ.

Brunnichia cirrhósa Gært. Fruct., 1. t. 45. f. 2., is a tendriled climber, a native of Carolina, with alternate, cordate, acuminate leaves, and flowers in paniced racemes. It was introduced in 1787, and is occasionally met with in old collections; for example, in the Cambridge Botanic Garden.

Rumex Lunária L., Pluk. Alm., 252, 253., is a native of the Canaries, with roundish glaucous leaves, which has been occasionally found in green-houses, since the days of Parkinson. It grows to the height of 5 ft. or 6 ft. in the Cambridge Botanic Garden; and produces its greenish flowers in June and July. There are two other African suffruticose species recorded in our *Hortus Britannicus*; and there is a plant in the Horticultural Society's Garden, from Moldavia, which has twining stems, and of which a portion is represented in fig. 1167. It grows against a wall with an east aspect, and, though frequently killed down during winter, never fails to spring up vigorously the following spring.

Polygonum adpressum R. Br., Bot. Mag., t. 3145., the Macquarrie Harbour vine, is a native of Van Diemen's Land, principally on the sea shore, about Macquarrie Harbour. It is an evergreen climber or trailer, growing to the height of 60 ft.; flowering from May to August; and ripening its fruit in December and January. The flowers are axillary, and are succeeded by racemes of fruit, which, at first sight, resemble grapes. "The seed of all the polygonums, which is a small hard nut, is known to be wholesome, (buck-wheat, for example); but in *P. adpressum* the seed is invested with the enlarged and fleshy segments of the calyx, which gives to each fruit the appearance of a berry: some acidity in this fruit renders it available for tarts." (*Bot. Mag.*, April, 1839; see also *Gard. Mag.*, vol. viii. p. 347, and vol. xi. p. 341.) This plant was introduced in 1822; and, though considered as requiring the green-house, yet we have little doubt it would live against a conservative wall, or as a trailer on dry rockwork, in peat soil, in a warm situation. The extraordinary rapidity of its growth might perhaps recommend it for the same purposes as the cobœa, and other rapid-growing climbers.



CHAP. XCIII.

OF THE HARDY AND HALF-HARDY LIGNEOUS PLANTS OF THE ORDER LAURACEÆ.

This order is distinguished from all others by the following short characteristics:—Anthers opening by valves which curve upwards; carpels solitary and superior; and ovules pendulous. (*Lindl. Nat. Syst. of Bot.*) The only other order treated of in our work, in which there is an analogous mode of opening in the anthers, is *Berberacæ*. The species are chiefly trees, some of them shrubs, natives of Asia and North America, and one of them of the south of Europe.

GENUS I.



LAURUS Plin. THE LAUREL, or BAY, TREE. Lin. Syst. Enneándria Monogýnia.

Identification. Pliny, on the authority of C. G. Nees von Esenbeck in *Lindl. Nat. Syst. of Bot.*, p. 202; *Lin. Gen.*, No. 503., in part; and so of most other botanical authors.

Synonymes. *Sassafras* and *Benzoin*, C. G. Von Esenbeck; *Daphnè*, *Greek*.

Derivation. From *laus*, praise; in reference to the ancient custom of crowning the Roman conquerors with laurel in their triumphal processions. There appears some doubt of the *Laurus nóbilis* being the *Laurus* of the Romans, and the *Daphnè* of the Greeks. (See *Dáphne*.) As, however, nothing certain is known of the subject, we have followed the popular belief; and, in the history given below of the *Laurus nóbilis*, we have treated it as if identical with the *Daphnè* of the Greeks.

Gen. Char., &c. *Sexes* polygamous, or diœcious. *Calyx* with 6 sepals. *Stamens* 9; 6 exterior, 3 interior, and each of them having a pair of gland-like bodies

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attached to its base. These last have been deemed imperfect stamens. Anthers adnate; of 2 cells in most of the species, of 4 unequal ones in the others: each cell is closed by a vertical valve that opens elastically, and often carries up the pollen in a mass. Fruit a carpel that is pulpy externally and includes one seed. Cotyledons eccentrically peltate, or, in other words, attached to the remainder of the embryo a little above their base line; as, according to Brown, is the case in all Lauracæ. — Species about 9. Trees or shrubs. Leaves alternate, deciduous, or persistent in 4 species, entire, or lobed. Flowers, of the kinds having deciduous leaves, appearing before the leaves, in small conglomerate umbels; or, in *L. Sassafras* L. and *L. álvida* Nutt., in conglomerate bracteate racemes. (Nuttall chiefly.) *L. carolinénsis* Catesby is an evergreen species of the United States. *L. nóbilis* W. is an evergreen species of Italy. The latter has fragrant leaves. Most of the American kinds have fragrant bark, and their groups of flowers attended by the scales of the buds that had included them. (*Sims* in *Bot. Mag.*) The genus *Laúrus* L. has been divided, and several genera formed out of it; but all the hardy species are here retained under the generic name of *Laúrus*. There are only three perfectly hardy species, *Laúrus nóbilis*, *L. Sassafras*, and *L. Benzoin*, but there are several that will live in the open air in mild climates, or with a little protection.

A. Plants evergreen; hardy.

♣ † 1. *L. NO'BILIS* L. The noble Laurel, or Sweet Bay.

Identification. Lin. Sp. 529.; Hort. Cliff., 155.; Mill. Dict., No. 1.; Martyn's Mill., No. 9.; Willd. Sp. Pl., 2. p. 479.; Lodd. Cat., ed. 1836.
Synonymes. *Laurus Camer.*, *Tourn.*, *Dodon.*, *Bay*; *L. vulgaris Bauh. Pin.*, 460.; *Laurier* commun, *Laurier* franc, *Laurier d'Apollon*, *Laurier à sauce*, *Fr.*; *gemeine Lorbeer*, *Ger.*
Engravings. Blackw. Herb., t. 175.; Flor. Græc., t. 365.; and the plate in our last Volume.

Spec. Char., &c. Evergreen. Flowers 4-cleft. Sexes diœcious. Leaves lanceolate, veiny. A native of Italy and Greece. (*Willd. Sp. Pl.*, ii. p. 480.)

Varieties.

- ♣ *L. n. 2 undulata* Mill. is a low shrub, seldom growing higher than 4 ft. or 6 ft., with leaves waved on the edges, which is stated in the *Nouveau Du Hamel* to be harder than the species.
- ♣ *L. n. 3 salicifolia* Swt., *L. n. angustifolia* Lodd. Cat., is a shrub, rather higher than the preceding variety, with long narrow leaves, not so thick as those of the species, and of a lighter green.
- ♣ *L. n. 4 variegata* Swt., *L. n. fòl. var.* Lodd. Cat. — Leaves variegated.
- ♣ *L. n. 5 latifolia* Mill. has the leaves much broader and smoother than those of the species. This is the broad-leaved bay of Asia, Spain, and Italy, and it is generally considered as too tender for the open air in England.
- ♣ *L. n. 6 crispa* Lodd. Cat. has the leaves somewhat curled.
- ♣ *L. n. 7 flore plèno* N. Du Ham. has double flowers.

There are also occasionally variations, such as the stamens varying in number, and the stamens being sometimes expanded flat.

Description, &c. An evergreen tree, or rather enormous shrub, sometimes growing to the height of 60 ft., but always displaying a tendency to throw up suckers; and rarely, if ever, assuming a tree-like character. The leaves are evergreen, and of a firm texture; they have an agreeable smell, and an aromatic, subacid, slightly bitterish taste. The flowers are diœcious, or the male and female on different trees, and are disposed in racemes shorter than the leaves. The male tree is the most showy, from the greater proportion of yellow in the flowers. The berry is ovate, fleshy, and of a very dark purple, approaching to black. The sweet bay tree is a native of the south of Europe, and the north of Africa, where its general height is about 30 ft. St. Pierre observes that the wild bay trees on the banks of the river Peneus in Thessaly are remarkably fine, which might probably give rise to the fable of *Daphne* (supposing the Greek *daphnè* to be this tree) being a nymph, the daughter of that river.

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Pallas mentions having found it in Tauria. The exact date of its introduction into Britain is unknown, but it must have been previous to 1562, as it is mentioned in Turner's *Herbal*, published in that year; and we find that, in the reign of Elizabeth, the floors of the houses of distinguished persons were strewed with bay leaves. It was formerly considered medicinal, both leaves and berries being highly aromatic and stomachic; they are also astringent and carminative. An infusion of them was not only considered beneficial, when taken internally, but it was used for fomentations, &c. At present, the principal use of the tree is as an ornamental plant, though the leaves are still employed for flavouring custards, blancmange, &c. In mythology this tree is celebrated as having once been Daphne, the daughter of Peneus, who, flying from the embraces of Apollo, and reaching the banks of her parent stream, called on the river god for aid, and was changed into a laurel. In the age of Roman greatness, this tree was considered as the emblem of victory, and also of clemency. The victorious generals were crowned with it in their triumphal processions; every common soldier carried a sprig of it in his hand; and even the dispatches announcing a victory were wrapped up in, and ornamented with, leaves of bay. The aromatic odour of these trees was supposed by the ancient Romans to have the power of dispelling contagion, and during a pestilence the Emperor Claudius removed his court to Laurentine, so celebrated for its bay trees. Theophrastus tells us that superstitious Greeks would keep a bay leaf in their mouths all day, to preserve themselves from misfortunes. The Greeks had also diviners who were called Daphnephagi, because they chewed bay leaves, which they pretended inspired them with the spirit of prophecy. The bay was dedicated to Apollo, and the first temple raised to that god at Delphi was formed of the branches of the tree. It was the favourite tree of the poets: and we are told that Maia, the mother of Virgil, dreamt that she was delivered of a bay tree; and that one of these trees sprang from Virgil's ashes, and is still growing over his tomb. In later times it was supposed to be a safeguard against lightning; and Madame De Genlis mentions the device of the Count De Dunois, which was a bay tree, with the motto "I defend the earth that bears me." It was a custom in the middle ages, to place wreaths of laurel, with the berries on, on the heads of those poets who had particularly distinguished themselves; hence our expression, poet laureate. "Students who have taken their degrees at the universities are called bachelors, from the French *bachelier*, which is derived from the Latin *baccalaureus*, a laurel berry. These students were not allowed to marry, lest the duties of husband and father should take them from their literary pursuits; and, in time, all single men were called bachelors." (*Sylva Flor.*, i. p. 115.) This tree is mentioned by Chaucer as the crown of the Knights of the Round Table.

Soil, Propagation, &c. The *Laurus nobilis* requires a good free soil, and it will not thrive in the open air, in a climate much colder than that of the environs of London. It is generally propagated by layers; but as the berries are ripened in the south of England, and can be had in abundance from France, the species is very generally increased from seeds, and the varieties only raised from layers or cuttings. As an evergreen shrub, not only beautiful in itself, but connected with many classical and interesting associations, it ought to have a place in every collection. As it forms a dense conical bush, when not trained to a single stem, it is well adapted for garden hedges. This tree is very tenacious of life, and the root or stump of an apparently dead tree will often send up suckers two years after it has appeared to be dead.

Statistics. Laurus nobilis in the Environs of London. There are plants upward of 20 ft. high, at various places, the largest of which, that we have seen, is a plant at Syon 28 ft. high, forming an immense conical bush, 18 ft. in diameter at the base. The rate of growth in the neighbourhood of London, as deduced from the dimensions of several young plants sent us, is about 15 ft. in height, in 10 years.

Laurus nobilis South of London. The largest tree of this species in England is at Margram in Glamorganshire, the seat of C. P. Talbot, Esq., M.P., about 12 miles from Swansea. It is 61 ft. 6 in. high, and forms a magnificent bell-shaped bush, about 60 ft. in diameter at the base. In Devonshire,

at Killerton, 90 years planted, it is 26 ft. high, the diameter of the trunk 1 ft. In Somersetshire, at Nettlecombe, 70 years planted, it is 22 ft. high, the diameter of the trunk 20 in., and of the head 39 ft. In Surrey, at Claremont, 25 ft. high, as a bush, the branches covering a space 15 ft. in diameter. In Sussex, at Arundel Castle, it is 25 ft. high.

Laurus nobilis North of London. In Bedfordshire, at Southhill, 22 years planted, it is 10 ft. high. In Berkshire, at White Knights, 30 years planted, it is 13½ ft. high. In Cheshire, at Kimmel Park, 20 years planted, it is 18 ft. high; at Eaton Hall, 14 years planted, it is 9 ft. high, and the diameter of the space covered by the branches 10 ft. In Shropshire, at Willey Park, 10 years planted, it is 12 ft. high. In Suffolk, at Finborough Hall, 60 years planted, it is 20 ft. high; at Great Livermere, 12 years planted, it is 18 ft. high. In Warwickshire, at Combe Abbey, 40 years planted, it is 14 ft. high, against a wall. In Yorkshire, at Hackress, 16 years planted, it is 8 ft. high; at Grimston, 13 years planted, it is 14 ft. high.

Laurus nobilis in Scotland. At Gosford House, 36 years planted, it is 15 ft. high, the diameter of the space covered by the branches 12 ft.; at Dalhousie Castle, 14 years planted, it is 15 ft. high, against a wall. In Berwickshire, at the Hirsell, 35 years planted, it is 14 ft. high, against a wall. In Haddingtonshire, at Tynningham, it is 10 ft. high. In Aberdeenshire, at Thainston, it grows 8 in. in a year, and stands the winter well in sheltered situations. In the Isle of Bute, at Mount Stewart, it is 27 ft. high, and the diameter of the space covered by the branches 26 ft. In Ross-shire, at Brahan Castle, it is 11 ft. high. In Stirlingshire, at Airthrey Castle, 45 years planted, it is 14 ft. high.

Laurus nobilis in Ireland. At Cypress Grove, Dublin, it is 60 ft. high, the diameter of the trunk 2 ft. 2 in., and of the head 25 ft. In the Cullen's Wood Nursery, 35 years planted, it is 25 ft. high, the diameter of the trunk 2½ ft., and of the head 24 ft. In Wicklow, at Shelton Abbey, 16 years planted, it is 34 ft. high. In Fermanagh, at Florence Court, 30 years planted, it is 10 ft. high.

Laurus nobilis in Foreign Countries. In France, in the Botanic Garden, Toulon, 14 years planted, it is 19 ft. high, the diameter of the trunk 6 in.; at Vacluse, among the scattered houses not far from the fountain, it was 15 ft. high, in 1819. Throughout Germany it is a green-house plant. In Russia, in the Crimea, it requires protection during winter. In Italy and Spain it attains a larger size than anywhere else in Europe, forming immense bushes, from 50 ft. to 70 ft. in height.

Commercial Statistics. Plants of the species in the London nurseries are 1s. each, and the varieties from 1s. 6d. to 2s. 6d.; at Bollwyller it is a greenhouse plant; at New York, plants are 1 dollar each.

B. Plants evergreen; half-hardy.

‡ 2. *L. CAROLINENSIS* Catesb. The Carolina Laurel, or Red Bay.

Identification. Catesb. Car., 1. p. 63.; Michx. Fl. Amer., 1. p. 245.; Pursh Fl. Amer. Sept., 1. p. 276.; Spreng. Syst., 2. p. 665.

Synonymes. *L. Borbonia* Lin. Sp., 529., Syst., 383., Martyn's Mill., No. 13., N. Du Ham., 2. p. 163., Lodd. Cat., ed. 1836.; *L. axillaris* Lam.; *Borbonia* sp. Plum. Gen., 4. ic. 60., Pérsée Borbonia Spreng.; the broad-leaved Carolina Bay; Laurier rouge, Laurier Bourbon, Laurier de Caroline, Fr.; Carolinischer Lorbeer, Rother Lorbeer, Ger.

Engravings. Catesb. Car., t. 63.; Michx. N. Amer. Syl., 2. t. 82.; N. Du Ham., 2. t. 33.; and our fig. 1168. after Michaux, and fig. 1169. after Du Hamel.

Spec. Char., &c. Evergreen. Leaves oval, lanceolate, slightly glaucous beneath. Flowers in peduncled axillary groups. (*Spreng. Syst.*, ii. p. 265.) An evergreen tree, a native of North America, from Virginia to Louisiana; introduced in 1739, and flowering in May; but seldom found in collections.

Varieties.

- ‡ *L. c. 2 glabra* Pursh has the leaves slightly glabrous.
- ‡ *L. c. 3 pubescens* Pursh has the leaves slightly pubescent.
- ‡ *L. c. 4 obtusa* Pursh has the leaves ovate-obtuse.

All these varieties were introduced in 1806; and they all flower from May to July. In our *Hortus Britannicus*, and other modern catalogues, *L. Borbonia* and *L. carolinensis* are made distinct species; the former being said to be tender, and introduced in 1739, and the latter to be hardy, and introduced in 1806. Both, however, are said to be the American red bay; and in Pursh's *Fl. Amer. Sept.*, and in the *N. Du Ham.*, they are considered identical. It appears probable that this is the case; and, as it appears from Michaux (*N. Amer. Sylva*, ii. p. 150.), that the tree differs exceedingly according to the latitude in which it grows, *L. Borbonia* (fig. 1168.) may be the form it assumes in the southern states, and *L. carolinensis* (fig. 1169.) its appearance in the more northern ones.

Description, &c. The red bay, though it sometimes, in the south of Georgia and the Floridas, attains the height of 60 ft. or 70 ft., with a trunk from 15 in.



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to 20 in. in diameter, yet rarely exhibits a regular form: its trunk is generally crooked, and divided into several thick limbs at 8 ft., 10 ft., or 12 ft. from the ground. In America, Michaux tells us, "upon old trunks the bark is thick, and deeply furrowed; that of the young branches, on the contrary, is smooth, and of a beautiful green colour. The leaves are about 6 in. long, alternate, oval-acuminate, glaucous on the lower surface, and evergreen. When bruised they diffuse a strong odour, resembling that of the sweet bay (*Laúrus nóbilis*),



and may, like those of that species, be employed in cookery." (*Michx. North Amer. Syst.*, ii. p. 151.) The male flowers come out in long bunches from the axils of the leaves; and the female flowers in loose bunches on pretty long red peduncles. The berries are of a dark rich blue, in red cups, and they grow two, and sometimes three, together. The red bay is found in the lower part of Virginia, and it continues in abundance throughout the maritime districts of the Carolinas, Georgia, the two Floridas, and Lower Louisiana. Mixed with the sweet bay (*Laúrus nóbilis*), tupelo (*Nýssa biflóra*), red maple (*Acer rúbrum*), and water oak (*Quérecus aquática*), it fills the broad swamps which intersect the pine barrens. A cool and humid soil appears essential to its growth; and it is remarked, that the farther south it grows, the more vigorous and beautiful is its vegetation. It was discovered by Catesby, and described and figured by him in his work on Carolina; Miller cultivated it in 1739. In France, Plumier constituted it a genus, to which he gave the name of *Borbônia* in honour of Gaston de Bourbon, son of Henry IV., and uncle of Louis XIV. In America, the wood of the red bay is used for cabinet-making, as it is very strong, and of a beautiful rose-colour, has a fine compact grain, and is susceptible of a brilliant polish, having the appearance, as Catesby tells us, of watered satin. Before mahogany became the reigning fashion in cabinet-making, Michaux observes, the wood of the red bay was commonly employed in the southern states of North America by the cabinet-makers, who produced from it articles of furniture of the highest degree of beauty; but trees of the red bay are now no longer to be found in North America of sufficient diameter for this purpose, and recourse is had to mahogany, which is imported from St. Domingo at a moderate price. It might also be employed in ship-building, and for other purposes of construction, as it unites the properties of strength and durability; but its trunks are rarely found of sufficient dimensions to render it available for these purposes. In England it is solely considered as an ornamental tree; and as it is more tender than the common sweet bay, it is only suitable for warm or sheltered situations, or for being placed against a wall.

✻ 3. *L. CATESBEIANA* Michx. Catesby's Laurel, or Red Bay.

Identification. Michx. Fl. Bor. Amer., 1. p. 244.; Spreng. Syst., 2. p. 265.; Pursh Fl. Amer., Sept. 1., p. 275.

Engraving. Catesb. Car., t. 28.

Spec. Char., &c. Evergreen. Leaves ovate-lanceolate, glossy. Flowers in a terminal panicle. Fruit ovate. (*Spreng. Syst.*, 2. p. 265.) An evergreen shrub, a native of the sea-coast of Georgia and Carolina, introduced in 1830, and flowering in May. The flowers are white, and the berries black, based by red calyxes, on thick red peduncles. We have not seen the plant.

✻ 4. *L. AGGREGATA* Sims. The grouped-flowered Laurel, or Bay.

Identification. Sims Bot. Mag., t. 2497.

Engravings. Bot. Mag., t. 2497.; and our fig. 1170.

Spec. Char., &c. Evergreen. Leaves ovate-acuminate, 3-nerved, glaucous beneath. Flowers upon distinct pedicels, disposed in axillary groups, that are attended at the base with scaly, ovate, concave bractes. (*Sims in Bot. Mag.*, t. 2497.) An evergreen shrub, a native of China,

introduced in 1821. The leaves are alternate, petiolated, of a yellowish or apple green on the upper side, and very glaucous on the under, with the three nerves uniting a little above the insertion of the petiole, and terminating short of the point of the leaf. The young shoots are axillary, and come out from among the flowers, and are furnished with several membranaceous slightly coloured scales, or a sort of stipules, which are very deciduous. It is rather tender; but, from the locality, where it is indigenous, it would probably succeed with very little protection against a conservative wall.

L. foetens Ait., *L. madeirænsis* Lam., *Pérsea foetens* Spreng., is a native of Madeira, and the Canary Islands, introduced in 1760, and producing its greenish yellow flowers from March to October. In its native country it forms a small tree 20 ft. high; but in British gardens it is commonly kept in a green-house, or in a cold-pit. The plant, however, in the Horticultural Society's Garden, has stood out as a bush since 1831, and is now upwards of 4 ft. high. There can be little doubt that this, and the other species enumerated as half-hardy, would stand against a wall with very little protection.

L. Myrrha Lour. is a native of China, which has stood against a wall in the Horticultural Society's Garden since 1832. It is generally injured more or less when the winters are severe; but it always springs up again, and grows vigorously during summer.

L. indica L. is an evergreen tree, with noble foliage, which lives and attains a considerable size in our conservatories and green-houses; and there can be little doubt that in the south of England it would live against a conservative wall, at least as well as the orange and the lemon.



C. Leaves deciduous.

‡ 5. *L. SASSAFRAS* L. The Sassafras Laurel, or Sassafras Tree.

Identification. Lin. Hort. Cliff., 154. Gron. Virg., 46.; Kalm It., 2. p. 270. 434.; Mill. Dict., No. 7.; Trew. Ehret, t. 59. 60.; Willd. Sp. Pl., 2. p. 485.; Lodd. Cat., ed. 1836.

Synonymes. *Cornus más odorita*, folio trifido, margine plano, Sassafras dicta, Pluk. Atm., 120, t. 222 f. 6.; *Catesb. Car.*, 1. p. 55. t. 55.; *Seligm. Av. Ic.*, 2. t. 10.; Sassafras arbor, ex Florida, ficulneo folio, *Bauh. Pin.*, 431.; *Sassafras* sp. *C. G. Nees Von Esenbeck*; *Pérsea Sassafras* Spreng.; *Laurier Sassafras*, *Fr.*; *Sassafras Lorbeer*, *Ger.*

Engravings. Trew. Ehret, t. 59. 60.; Blackw. Herb., t. 267.; Giesecke Ic., fasc. 1. No. 9.; Pluk. Alm., t. 222. f. 6.; *Catesb. Car.*, 1. t. 55.; *Seligm. Av. Ic.*, 2. t. 10.; and plates in our last Volume.

Spec. Char., &c. Sexes dioecious. Habit arborescent. Both leaves and flowers are produced from the same buds. Buds, younger branches, and the under surface of the leaves, pubescent. Leaves entire, or with 2—3 lobes. Veins prominent on the under side. Flowers in corymbose conglomerate racemes. Anthers with 4 unequal cells. In the female flower, additionally to the pistil, are 6 gland-like bodies, like those in the male flowers. (*Nutt. Gen.*, i. p. 259.) A deciduous tree, from 40 ft. to 50 ft. high. A native of North America. Introduced in 1633, and flowering in April and May.

Varieties. Nuttall states (*Gen. & Cat. N. A. P.*) that the inhabitants of North and South Carolina distinguished two kinds of sassafras, the red and the white, calling the latter, also, the smooth. The red he identifies with the *L.*, subgenus *Euósmus* Nutt., *Sassafras* L.; and the white or smooth he considers a species belonging to the same subgenus, which he calls *L. E. álvida* Nutt., and of which he has adduced the following characteristics. Its buds and younger branches are smooth and glaucous; its leaves are every where glabrous and thin, and the veins are obsolete on the under surface; the petiole is longer. He had not seen it in flower. The root is much more strongly camphorated than the root of the red sort (*L. Sassafras*), and is nearly white. This kind is better calculated to answer as a substitute for ochra (*Hibiscus esculéntus*) than the *L. Sassafras*, from its buds and young branches being much more mucilaginous. It is abundant in North and South Carolina, from the Catawba Mountains to the east bank of the Santee, growing with *L. Sassafras*, which, in North Carolina, is less abundant. (*Nut. Gen.*, i. p. 259, 260.)

Description, &c. The sassafras tree often grows, even in England, to the height of 40 ft. or 50 ft. (See plate of the tree at Syon, in our last Volume.) The leaves, which vary very much in size and shape, are covered, when they first appear, with a soft woolly down; they are generally deeply lobed, on long footstalks, and of a pale green; they fall off early in autumn. The flowers are of a greenish yellow, and but slightly odoriferous; the berries are oval, of a bright but deep blue, and contained in small dark red cups,

supported by long red peduncles. These berries are greedily devoured by birds, and consequently do not remain long on the tree. The bark of the young branches is smooth, and beautifully green; but, when old, it becomes of "a greyish colour, and is chapped into deep cracks. On cutting into it, it exhibits a dark dull red, a good deal resembling the colour of Peruvian bark." (*Michx. N. Amer. Syl.*, ii. p. 146.) In the United States the sassafras is found as far north as lat. 43°; but it there appears only as a tall shrub, rarely exceeding 15 ft. or 20 ft. in height. In the neighbourhood of New York and Philadelphia, however, it grows to the height of 40 ft. or 50 ft., and attains a still greater size in the southern states. It is abundant from "Boston to the banks of the Mississippi, and from the shores of the ocean in Virginia to the remotest wilds of Upper Louisiana beyond the Missouri, comprising an extent in each direction of more than 1800 miles." (*Michx.*) "The sassafras, on account of its medicinal properties, was one of the first American trees which became known to Europeans. Monardes, in 1549, and after him Clusius," treat of its uses. Gerard calls it the ague tree, and says, that a decoction of its bark will cure agues, and many other diseases. The bark is still employed in medicine, that of the roots being preferred; and it is said to be an excellent sudorific. A decoction of the chips is well known as a remedy for scorbutic affections. In different parts of the United States, a tea is made of the flowers, which is considered very efficacious in purifying the blood. In Louisiana the leaves are used to thicken pottage; and in Virginia a beer is made of the young shoots. The sassafras chips which are sold in the English druggists' shops are formed of the wood of this tree; but what are called the sassafras nuts are the fruit of the *Laúrus Pùcheri* of the *Flora Peruviana*. (See *Lindl. Nat. Syst. of Bot.*) Bigelow says that this tree is produced in almost every part of the United States. "It not only inhabits every latitude from New England to Florida, but we are told it is also found in the forests of Mexico, and even in those of Brazil. Its peculiar foliage, and the spicy qualities of its bark, render it a prominent object of notice, and it seems to have been one of the earliest trees of the North American continent to attract the attention of Europeans. Its character, as an article of medicine, was at one time so high, that it commanded an extravagant price, and treatises were written to celebrate its virtues. It still retains a place in the best European pharmacopæias." (*Bigelow's American Botany*, vol. ii. p. 141.) He adds that "the bark has an agreeable smell, and a fragrant spicy taste. The flavour of the root is more powerful than that of the branches; and both flavour and odour reside in a volatile oil, which is readily obtained from the bark by distillation. The bark and pith of the young twigs abound with a pure and delicate mucilage; and in this mucilage and the volatile oil all the medicinal virtues of the tree are contained. The bark and wood were formerly much celebrated in the cure of various complaints, particularly in rheumatism and dropsy; but they are now only recognised as forming a warm stimulant and diaphoretic." (*Ibid.*) The sassafras is of little value as a timber tree. In America, the wood, which is white or reddish, is sometimes used for making bedsteads and other articles of furniture, which are not liable to be attacked by insects, and have a most agreeable odour, which they retain as long as they are sheltered from the sun and rain. The wood is of very little esteem for fuel; and the "bark contains a great deal of air, and snaps while burning like that of the chestnut." (*Michx.*) The most interesting historical recollection connected with this tree is, that it may be said to have led to the discovery of America; as it was its strong fragrance, smelt by Columbus, that encouraged him to persevere when his crew mutinied, and enabled him to convince them that land was near at hand.

Soil, Propagation, &c. Any free soil, rather moist than dry, will suit this species, which is generally propagated from imported seeds, which should be sown or put in a rot-heap, as soon as received, as they remain a year, and sometimes two or three years, in the ground, before they come up. The sassafras may also be propagated by cuttings of the roots, or by suckers, which

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the roots of old trees (at Syon, for example,) throw up in great abundance. The situation where the tree is finally planted should be sheltered; and, in the north of England and in Scotland, to insure fine foliage, it should be planted against a wall.

Statistics. Laurus Sassafras in England. In the environs of London, the largest tree is at Syon, where it is 40 ft. high, the diameter of the trunk 1 ft. 8 in., and of the head 29 ft. At Kew, it is 40 ft. high. In the Fulham Nursery, it is 30 ft. high. In the Mile End Nursery, it is 21 ft. high. South of London, in the Isle of Jersey, in Saunders's Nursery, 14 years planted, it is 12 ft. high, the diameter of the trunk 9 in., and of the head 9 ft. In Kent, at Cobham Hall, 30 years planted, it is 50 ft. high, and the diameter of the trunk 1 ft. 6 in. In Surrey, at St. Ann's Hill, 30 years planted, it is 25 ft. high, the diameter of the trunk 1 ft. 2 in., and of the head 12 ft. North of London, in Worcestershire, at Croome, 40 years planted, it is 25 ft. high, the diameter of the trunk 9 in., and of the head 12 ft.

L. Sassafras in Scotland. In the Isle of Bute, at Mount Stewart, it is 10 ft. high, the diameter of the trunk 3 in., and of the head 5 ft.

L. Sassafras in Ireland. In the environs of Dublin, at Castletown, it is 28 ft. high, the diameter of the trunk 1 ft. 6 in. North of Dublin, in Galway, at Coole, it is 19 ft. high, the diameter of the trunk 12 in., and of the head 22 ft. In Louth, at Oriel Temple, 12 years planted, it is 9 ft. high, the diameter of head 5 ft.

L. Sassafras in Foreign Countries. In France, at Sceaux, 16 years planted, it is 15 ft. high, the diameter of the trunk 8 in., and of the head 6 ft. In the neighbourhood of Nantes, 24 years planted, it is 30 ft. high, with a trunk 2 ft. in diameter. In the Botanical Garden at Avranches, 30 years planted, it is 20 ft. high, the diameter of the trunk 8 in., and of the head 12 ft. In Italy, in Lombardy, at Monza, 12 years planted, it is 10 ft. high, the diameter of the trunk 8 in., and of the head 5 ft.

Commercial Statistics. Plants in the London nurseries, are 5s. each; and seeds 6s. a quart; at Bollwyller, plants are 2 francs and 30 cents each; and at New York, 25 cents.

6. *L. BENZOÏN* L. The Benzoin Laurel, or Benjamin Tree.

Identification. Lin. Hort. Cliff., 154; Gron. Virg., 46; Mill. Dict., No. 6; Willd. Arb., 165; Willd. Sp. Pl., 2. p. 485; Lodd. Cat., ed. 1836.

Synonymes. Arbor virginiana citreæ vel limonii folio, Benzoinum fundens, *Comm. Hort.*, l. p. 189. t. 97; *Laurus estivalis* Wagh. *Amer.*, 87; *L. Pseudo-Benzoin* Mich. Fl. *Amer.*, 1. p. 243; *L. Eugénium Benzoin* Nutt. *Gen.*, 1. p. 259; *Benzoin*, sp. C. G. *Nees Von Esenbeck*; Spice Bush, Spice Wood, or wild Allspice, *Amer.*, according to Nuttall; Laurier faux Benzoin, *Fr.*; Benzoin Lorbeer, *Ger.*

Engravings. *Comm. Hort.*, 1. t. 97.; *Pluk. Alm.*, t. 139. f. 34; and our fig. 1171.

Spec. Char., &c. Leaves cuneate-obovate, entire, the under side whitish and partly pubescent, deciduous. Sexes polygamous. Flowers in umbels. Buds and pedicels of the umbels glabrous. (*Nutt. Gen.*, i. p. 259.) Leaves without nerves, ovate, acute at both ends.

(*Willd. Sp. Pl.*, ii. p. 485.) A deciduous shrub, a native of Virginia, where it grows to the height of 10 ft. or 12 ft. It was introduced in 1688, and is not unfrequent in collections. In British gardens, it forms a rather tender peat-earth shrub, handsome from its large leaves, but seldom thriving, except where the soil is kept moist and the situation sheltered. The bark of *L. Benzoin* is highly aromatic, stimulant, and tonic, and is extensively used in North America in intermittent fevers. The oil of the fruit is said to be stimulant. (*Lindl. Nat. Syst. of Bot.*, on the information of Barton.) The true Benjamin tree, or gum benzoin, is not, as Ray supposed, this *Laurus Benzoin*, but a species of *Styrax*; as was first shown by the late Mr. Dryander, in the *Philosophical Transactions* for 1787, p. 307, t. 12. (*Rees's Cyclop.*) *Laurus Benzoin* is propagated from imported seeds, which require to be treated like those of *Laurus Sassafras*.



Statistics. The largest plant, in the neighbourhood of London, is at Ham House, where it is 15 ft. high; at Syon, it is 14 ft. high; at Kew, 6 ft. high; in the Horticultural Society's Garden, 8 ft. high. In Sussex, at Westdean, 14 years planted, it is 12 ft. high. In Warwickshire, at Newnham Paddocks, 10 years planted, it is 5 ft. high. In Worcestershire, at Croome, 15 years planted, it is 15 ft. high; at Hagley, 12 years planted, it is 6 ft. high. In Ireland, at Oriel Temple, 12 years planted, it is 6 ft. high. In Germany, near Vienna, at Brück on the Leytha, 25 years planted, it is 15 ft. high. At Berlin, in the Botanic Garden, 14 years planted, it is 10 ft. high. In Italy, at Monza, 24 years planted, it is 14 ft. high.

Commercial Statistics. Price of plants, in the London nurseries, 1s. 6d. each, and seeds 6s. a quart; at Bollwyler, 2 francs; and at New York, 25 cents.

7. *L. (B.) DIOSPYRUS Pers.* The Diospyrus-like Laurel, or Bay.

Identification. Pers. Syn., 1. p. 450.; Bot. Mag., t. 1470.; where Dr. Sims states that Person's epithet, *Diospyrus*, is an abbreviation of Michaux's one of *diospyröides*.

Synonymes. *L. Eufœmus Diospyrus Nutt. Gen.*, 1. p. 259.; *L. diospyröides Michx. Fl. Bor. Amer.*, 1. p. 243.; ? *L. melissifolia Walt. Fl. Car.*, 134. Dr. Sims (*Bot. Mag.*, t. 1470.) states that he has not much doubt that the *L. melissifolia Walter* is identical with this species; and he adds that Mr. Fraser, who was the friend of Walter, and editor of his work, always considered it as such, and has remarked that "the leaves are not at all like those of the balm; but it was, probably, the scent, not the form, that suggested the appellation."

Engravings. Bot. Mag., t. 1470.; and our fig. 1172.

Spec. Char., &c. Habit low, surculose, twiggy. Leaves oblong-oval and entire, the under side veiny and pubescent, deciduous. Flower buds and pedicels villous. Sexes diœcious. Fruit large. (*Nutt. Gen.*, i. p. 259.) A running twiggy shrub, 2 ft. or 3 ft. high, in its native swamps, in Virginia and Carolina; introduced in 1810. Leaves opaque, oblong-oval, attenuated towards the base, entire, the under side veiny and pubescent, deciduous. Scales of the buds purple, villous. Younger branches villous. Sexes diœcious. Flower buds and pedicels villous. Flowers disposed in sessile umbeled groups, 3—5 in a group. Perfect stamens 9. Gland-like bodies large, orange yellow. Fruit larger than that of *L. Benzoin*, oblong-ovate, scarlet, upon thick and distinct pedicels. Cotyledons large, thick, oily, attached by near their base to the remainder of the embryo. (*Nutt. Gen.*, i. p. 259.) It is what may be deemed the male sex that is represented in *Bot.*



Mag., t. 1470., and our fig. 1172.; and in the text of the *Bot. Mag.* is the following interesting information by Dr. Sims, on the structure of its flowers. There were 9 perfect stamens, and an imperfect ovary; and 6 glands on short pedicels, resembling so many little yellow mushrooms, with a warty pileus: the anthers had 2 cells each. (*Bot. Mag.*) *L. Pseudo-Benzoin Michx.* is supposed by Dr. Sims (*Bot. Mag.*, t. 1471.) to be either identical with, or a slight variation from, this species. The only plant which we have seen bearing the name of *L. Diospyrus* is at White Knights, where it so closely resembles *L. Benzoin*, as to leave no doubt in our mind that Dr. Sims's conjecture was right.

8. *L. (B.) ÆSTIVALIS L.* The summer Laurel, or Willow-leaved Bay.

Identification. Lin. Sp., 529.; Syst., 384.; Mart. Mill., No. 24.; Willd. Sp. Pl., 2. p. 485.

Synonymes. *L. enérvia Mill. Dict.*, No. 8.; *L. Eufœmus æstivalis Nutt. Gen.*, 1. p. 259.; Pond bush, *Amer.*; Sommer Lorbeer, *Ger.*

Engraving. Catesb. Car., 2. t. 28.

Spec. Char., &c. Leaves oblong-acuminate, entire, glabrous, veiny, deciduous. Flowers in umbels. Sexes polygamous. (*Nutt. Gen.*, i. p. 259.) Dr. Sims has noted, incidentally, in the *Bot. Mag.*, t. 1470., that there are two different specimens of the *L. æstivalis* in the Banksian herbarium; that one of them, the flowering specimen from Jacquín's herbarium, is evidently a specimen of the *L. geniculata Bot. Mag.*, t. 1471.; and that the other, in the leaves, is similar to the *L. Diospyrus Bot. Mag.*, t. 1470. Farther, Dr. Sims has noted, t. 1471., that it is not easy to say to which species *L. æstivalis* really belongs, and that if Linnæus had meant the character of supra-axillary branches to describe that the buds are produced below the branches, and not in the axils of them, it is as applicable to the allied *L. Diospyrus* and *L. geniculata*. (*Bot. Mag.*, t. 1470.) A shrub, about 6 ft. or 8 ft. high, a native of Virginia, in the swamps which intersect the pine barrens. Introduced in 1775. There was a plant in the Horticultural Society's Garden, some years ago, which is since dead.

9. *L. GENICULATA Michx.* The knee-flexed-branched Laurel, or Bay.
Identification. Michx. Fl. Bor. Amer., 1. p. 244.; Pers. Synops., 1. p. 450.; Walt. Fl. Car., p. 133.; Pursh Fl. Amer. Sept., 1. p. 276.; Bot. Mag., t. 1471.
Synonymes. *L. Eucosmus geniculata Nutt. Gen.*, 1. p. 259.; *L. estivalis Willd. Sp. Pl.*, 2. p. 484., according to Pursh.
Engravings. Bot. Mag., t. 1471.; and our fig. 1173.

Spec. Char., &c. Branches divaricate and flexuous. Leaves cuneate-oblong, mostly obtuse, about 1½ in. long, in many instances less than half an inch wide, entire, glabrous, except upon the under side near the base. Flowers in terminal small umbels, that are upon conspicuous footstalks and smooth. Anthers unequally 4-celled. Sexes polygamous. (*Nutt. Gen.*, i. p. 259.) Nuttall adds that this kind grows from 8 ft. to 12 ft. high, and that the branches are flexuous, grey, smooth, and so remarkably divaricated as to give a characteristic appearance to the pods which they border; and that its native localities are, invariably, sandy swamps, and the margins of lagoons, from Virginia to Florida. Dr. Sims has noted that the zigzag direction and deep colour of the branches distinguish the *L. geniculata* at first sight; and that he could not perceive in its bark any of the aromatic scent so remarkable in most of the genus, and which is so clearly perceptible in *L. Benzoin*. Pursh states that the flowers are yellow, and the berries globose and scarlet. We received a plant of this species from Bartram's Botanic Garden, in 1831: it appeared very distinct; but, owing to the crowded state of our garden, and the want of moisture, it died in the summer of 1834. Price of plants, at New York, 1 dollar.



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App. I. Half-hardy Species of Lauræcæ.

Cinnamomum Càmphora Swt. *Laurus Càmphora* L., the Camphor tree, (*N. Du Ham.*, 2. t. 35.; *Bot. Mag.*, t. 2658.; and our fig. 1174.) is a native of Japan, and other parts of Eastern India, where it grows to the height of the European lime tree, and makes a fine appearance, from its glossy shining leaves. The wood is white, with reddish waxy leaves, and the odour of camphor is exhaled from it, and from every other part of the plant. Camphor, and camphor oil, are well known medicines, which are obtained from this tree. Camphor is considered one of the principal diaphoretics, and is of a particularly subtle and penetrating



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nature, quickly diffusing itself through the whole human frame. It is used in a great variety of medical preparations. Camphor is obtained from the tree by splitting the wood into small pieces, and distilling it with water in an iron retort, covered with an earthen or wooden pot, in the hollow of which hay or straw is placed, to which the camphor adheres as it rises with the steam of the water. It is at first of a brownish white, and in very small particles, but, after being redistilled, it is compressed into the lumps which we see in the shops. The camphor used in Europe is chiefly imported from Japan. Camphor oil is obtained by making an incision in the trunk of the tree, and inserting a small tube of reed, through which the sap exudes, from which the oil is obtained by skimming. In British gardens the camphor tree is commonly kept in green-houses or cold-pits; and we have no doubt whatever, that, with a moderate degree of protection, it would live against a conservative wall.
C. verum Swt.; *Laurus Cinnamomum* L.; *L. Cassia* Bot. Mag., 1636.; and our fig. 1175.; the

cinnamon tree, is a native of the Island of Ceylon, and other parts of the East; and it has been introduced into South America, and the Isle of France, where it is cultivated for the bark. It is commonly considered as a stove plant, but it has ripened seeds in the conservatory of M. Boursault, at Paris, from which young plants have been raised, in 1827, 1828, and 1829, and these plants have stood the winter in the open air there for several years, with very little protection. It well deserves a trial, therefore, against a conservative wall, in British gardens.

C. Cassia D. Don; *Laurus Cassia* L.; *L. Cinnamomum* Bot. Rep.; *Pérsea Cassia* Spr.; the Wild Cinnamon, Bot. Rep., t. 596, which is a native of Ceylon, where it grows to the height of 50 ft. or 60 ft., with large spreading branches, is thought to be nothing more than *C. verum* in a wild state.

Other ligneous plants belonging to this order, natives of Japan, Mexico, the Cape of Good Hope, and of New South Wales, and usually kept in green-houses, will be found enumerated in our *Hortus Britannicus*. Most of them, we have no doubt, could make a much better appearance against a flued conservative wall, than ever they can do in a house.

CHAP. XCIV.

OF THE HALF-HARDY LIGNEOUS PLANTS BELONGING TO THE ORDER PROTEACEÆ.

ALL the plants of this order are ligneous; and, with very few exceptions, are natives of Australia, and the Cape of Good Hope. Many species have been introduced, belonging to upwards of 30

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genera; and, doubtless, there are a great number of these, particularly the natives of New Holland, which would stand the winters of the climate of London against a conservative wall.

Banksia littoralis R. Br. is a native of New Holland, where it forms a bush 8 ft. high. A plant stood against a wall in the Horticultural Society's Garden, from 1832 till it was killed by the severe spring of 1836.

B. oblongifolia Cav., Bot. Cab., 241, stood out with us at Bayswater for four years, but was killed in the spring of 1836.

Grevillea rosmarinifolia Cun. (fig. 1176.) is a very elegant plant, a native of New South Wales, where it grows to the height of 4 ft. or 5 ft. A plant has stood out in front of the stove at Kew, since 1826, flowering freely every year.

G. acuminata R. Br. (figs. 1177, 1178), is also a native of New South Wales, and is considered equally hardy with *G. rosmarinifolia*.

Hakea acicularis R. Br., Vent. Malm., 3.; *H. suavolens* R. Br.; and *H. pugioniformis* R. Br., Bot. Cab., 353., and our fig. 1179.; have stood out in the Horticultural Society's Garden since 1832.

It is probable that most of the species belonging to this order are equally hardy with those above enumerated; and we should have no hesitation in asserting that, against a flued wall, with straw hurdles to be set against it during severe weather, and taken off for an hour or more every fine day, all the *Proteaceæ* might be exhibited in the climate of London in greater vigour and beauty than they are in their native country. This may be thought a bold assertion; but, as it holds good in the case of *Erica* and *Pelargonium*, we see no reason why, if the same care were applied, the same should not follow in the case of all the plants of this very interesting order.



1179

CHAP. XCV.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER THYMELACEÆ.

THESE belong to two genera, *Daphne* L. and *Dirca* L., which have the following characters:—

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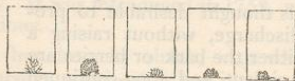
DA'PHNE L. Calyx inferior, somewhat salver-shaped; in most, of some other colour than that of the leaves, and, from its shape and colour, resembling a corolla; segments of its limb 4, deep, ovate, or oblong, imbricate in aestivation. Stamens 8, in two rows; the filaments with but a short part distinct from the tube of the calyx; the anthers not prominent beyond it. Ovary solitary. Ovule solitary, pendulous. Style very short. Stigma capitate. Fruit an ovate carpel, pulpy externally. Seed 1, pendulous. Shrubs. Inner bark silky. Most of the kinds evergreen. Leaves entire, in most alternate; if not alternate, opposite. Flowers terminal or axillary, mostly in groups, highly fragrant. The whole plant, in most, perhaps in all, intensely acrid and dangerous. (*Smith Eng. Flora; Lindl. Nat. Syst.; Brown Prod.,* and observation.)

DY'CA L. Calyx inferior, funnel-shaped, ending in 4 (Du Hamel has stated in the "essential character" 5) unequal teeth: it is of a pale yellow colour, and hence, and from its figure, resembles a corolla. Stamens 8, arising from the middle of the calyx, and prominent beyond its tip, unequal. Ovary solitary. Style thread-shaped, extending a little beyond the stamens. Stigma a simple point. Fruit a dry carpel. Seed 1, pendulous. *D. palustris L.* is the only species described; and is a low shrub, that has upright branches, a very tough bark, and flowers 3 together. (*Du Ham., Bot. Reg., Lindl. N. S.,* and observation.)

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GENUS I.

*DA'PHNE L.* THE DAPHNE. *Lin. Syst. Octándria Monogýnia.*

Identification. *Lin. Gen.* 192.; *Juss. Gen. Pl.* 77.; *Lam. Ill.* t. 290.; *Smith Eng. Flora.* 2. p. 228.

Synonyme. *Thymelæa Tourn. Inst.* t. 366.; *Gærtn.* t. 39.

Derivation. *Daphnè* is asserted by Lindley, and some other botanists, to have been the Greek name of the *Ruscus racemosus*, or Alexandrian laurel, into which it is fabled that Daphne was changed. "Why the name has been applied to the shrubs now called *Daphne*, it is not easy to say." (*Lindl. Bot. Reg.* t. 1177.) It is stated in Rees's *Cyclopædia*, under *Laurus*, that *L. nobilis* "is certainly the *Daphnè* of Dioscorides, and, consequently, the classical laurel. It is still called by the same name among the modern Greeks;" this is also the popular belief (See St. Pierre's *Études de la Nature*, Lempriere's *Class. Dict.*, &c. &c.) Supposing the *Daphnè* to have been the *Laurus nobilis*, or bay tree, it is easy to account for its being applied to this genus, the *D. Mezereum* being formerly called the dwarf bay in England; and nearly all the species retaining the names of laureole and laureola in France and Italy.

Holland,

Description, &c. Undershrubs, evergreen and deciduous, natives chiefly of Europe, but partly also of the cooler parts of Asia, including Japan and China. The odour of some of the species is very agreeable; and the bark of all of them is acrid. They are all beautiful, and rather difficult to propagate, except by seeds. The price of plants, in the London nurseries, is from 1s. to 2s. 6d. for all the sorts, except *D. Mezereum*, and *D. Laureola*, which are 6d. each.

A. *Leaves deciduous.*1. *D. MEZE'REUM L.* The Mezezeon Daphne, or common Mezezeon.

Identification. *Lin. Sp. Pl.* p. 509.; *Willd. Sp. Pl.* 2. p. 415.; *Mill. Dict.* n. 2.; *Smith Eng. Flora.* 2. p. 228.; *Lodd. Cat.* ed. 1836.

Synonymes. Spurge Olive, Spurge Flax; Flowering Spurge, *Parkinson*; Dwarf Bay, *Gerard*; Laureole femelle, Bois gentil, Mézèreon, Bois joli, *Fr.*; gemeiner Seidelbast, or Kellerbalz, *Ger.*; Peperachtige Daphne, *Dutch*; Laureola femina, Biondella, Camelia, *Ital.*; Laureola hembra, *Span.*

Derivation. Mezezeon and Mezezeon are said to be derived from *madzaryon*, the Persian name for this shrub.

Engravings. *Eng. Bot.* t. 1381.; *Ced. Fl. Dan.* t. 268.; and our *fig.* 1180.

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Spec. Char., &c. Leaves lanceolate, deciduous. Flowers distributed over the branches in threes mostly, and in pairs and fours, expanded before the leaves are protruded. A native of the woods of northern Europe. (*Willd., Smith,* and obs.) Found in woods, but rare, in the south and west of

England; growing to the height of 4 ft., and flowering in February, March, or April.

Varieties.

♣ *D. M. 2 flore albo* has white flowers and yellow fruit.

♣ *D. M. 3 autumnale*.— This is a remarkably distinct variety, not fastigiate in its mode of growth, but spreading; also with larger leaves than the species, and producing its flowers in autumn. These are very seldom succeeded by fruit, as might be expected from the season at which they are produced. It is a most desirable shrub, being commonly covered with its gay pinkish blossoms from November to March. It is rare in the nurseries about London; and is principally propagated by the Messrs. Backhouse of York.

Description, &c. The mezereon is a well-known shrub, much valued in our gardens and shrubberies for the beauty both of its flowers and fruit. It produces its agreeably fragrant flowers in February or March, before the leaves; when, as Cowper has beautifully expressed it, its branches are

“ Though leafless, well attired, and thick beset
With blushing wreaths, investing every spray.” *Task*, book v.

The whole shrub is poisonous to human beings, though the berries are a favourite food for finches, and other birds, more especially the robin. The bark is powerfully acrid: it is used in France for forming setons or slight blisters, and is very efficacious in cases where it is thought desirable to produce a slight serous discharge, without raising a large blister. When either the bark or berries are chewed, they produce violent and long-continued heat and irritation in the mouth and throat. The mezereon is sometimes used in medicine; but it requires to be administered by a skilful hand. When the berries have been eaten by children or others, accidentally, the best remedies are oil, fresh butter, linseed tea, milk, or some other kind of emollient, to allay the violence of the inflammation. The branches of this plant afford a yellow dye. The mezereon is of very easy culture. It is generally propagated by seeds; which, if suffered to get dry before they are sown, will remain two years in the soil; but which, if sown in autumn immediately after gathering them, generally come up the following spring. The best time for transplanting this shrub is in October, as it begins to vegetate very soon after Christmas. It thrives most in a loamy soil, and in an open situation; and, when it is properly treated, and has room, it will in 8 or 10 years form a bush 5 ft. or 6 ft. high, and 7 ft. or 8 ft. in diameter. There is a plant in the arboretum of Messrs. Loddiges, 6 ft. high. Price of plants, in the London nurseries, 50s. a hundred; and of the autumn-flowering variety, 1s. 6d. a plant: at Bollwyller, 50 cents a plant: and at New York, 20 cents, and of the white-flowered variety, 50 cents.



♣ *2. D. ALTAICA* Pall. The Altaic Daphne.

Identification. Pall. Fl. Ross., 1. p. 53. t. 35.; Willd. Sp. Pl., 2. p. 422.; Sims in Bot. Mag., t. 1875.; Lodd. Cat., ed. 1836.

Synonymes. Daphné altaïque, Laureole de Tartarie, Fr.; Sibirischer Seidelbast, Ger.

Engravings. Pall. Fl. Ross., 1. t. 35.; Bot. Mag., t. 1875.; Bot. Cab., t. 399.; and our fig. 1181.

Spec. Char., &c. Leaves obovate-lanceolate, glabrous. Flowers sessile, in terminal umbels, about 5 in an umbel. (*Sims* in Bot. Mag., t. 1875.) Bark reddish brown in colour. Leaves oblong, broader towards the upper extremity, and narrowed downwards, of a somewhat glaucous and yellowish green, the latter colour prevailing most while they are young. Flowers white, and scentless; produced in May and June. Lobes of

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the calyx revolute. A native of the Al-
taic Alps, in Siberia. (*Ibid.*) In the *Nouveau
Du Hamel*, it is stated that this plant bears a
striking resemblance, in its general appearance,
to the mezereon, with the exception of the
flowers, which are disposed in terminal umbels,
and are white and scentless. It is at present
not very common in British collections, though
it well deserves a place there, from its neat
compact habit of growth; and from its flowers,
which come in in succession to those of the
common mezereon. Plants, in the London
nurseries, are 2s. 6d. each.



3. *D. ALPINA* L. The Alpine Daphne.

Identification. Lin. Sp. 510., Syst., 371.; Willd. Sp. Pl., 2. p. 418.; Mill.
Dict., n. 5.; Gouan Illustr., 27.; Willd. Arb., 99.; Lodd. Cat., ed. 1836.
Synonymes. The Alpine Chamelea Marsh. Plant., 2. p. 112.; Daphne
des Alpes Fr.; Alpen Siedelbast, Ger.
Engravings. Lodd. Bot. Cab., t. 66.; and our fig. 1182.

Spec. Char., &c. Leaves lanceolate, a little obtuse, to-
mentose beneath, deciduous. Flowers sessile, aggre-
gate. (*Willd. Sp. Pl.*, ii. p. 418., and observation.) A
native of the Alps of Switzerland, Geneva, Italy, and
Austria; where it grows to the height of 2 ft., flower-
ing from May to July. It was introduced in 1759, and
is frequent in collections.



Description, &c. A low branchy shrub, with white
flowers, silky on the outside, which come out in clusters
from the sides of the branches, and are very fragrant.
They appear in March, and are succeeded by roundish
red berries, that ripen in September. It is quite hardy,
and is very suitable for rockwork; as the roots fix
themselves deeply into the crevices of the rocks.

B. Erect. Leaves persistent. Flowers lateral.

4. *D. LAUREOLA* L. The Laureola Daphne, or Spurge Laurel.

Identification. Lin. Sp. Pl., 510.; Willd. Sp. Pl., 2. p. 418.; Smith Eng. Flora, 2. p. 229.; Hook. Fl.
Scot., 119.; Jacq. Austr., t. 183.; Lodd. Cat., ed. 1836.
Synonymes. Daphnoides verum, vel Lauricola, Gesn., fasc. 1. 7. t. 6. f. 9.; Laurœola Raii Syn., 465.,
Ger. Em., 1404.; Thymela'ea Laurœola, Scop. Carn., 2. n. 463.; the Evergreen Daphne; Laurœole
male, Laurœole des Anglais, Fr.; Immergrüner Seidelbast, Ger.
Engravings. Eng. Bot., t. 119.; Jacq. Austr., t. 183.; and our fig. 1183.

Spec. Char., &c. Evergreen. Leaves obovate-lanceolate, smooth. Flowers
in axillary, simple, drooping clusters, that are shorter than the leaves:
flowers in each about 5. Calyx obtuse.
(*Smith Eng. Flora.*, ii. p. 229.) An ever-
green shrub; a native of Britain, and most
other parts of Europe, in woods; growing to
the height of 3 ft. or 4 ft., and producing its
yellowish green flowers, which are disposed in
clusters of 5 each, soon after Christmas, if
the weather be not very severe, and continuing
flowering till March. Though not showy in
its flowers, it is a valuable plant for a shrub-
bery, from its being evergreen, and from its
thick, glossy, shining leaves being disposed in
tufts at the ends of the branches, so as to give it a full bushy appear-
ance; which has a good effect in plantations, where it is desirable to pro-
duce masses of dark green. It thrives best in the shade, and will flourish
in situations under the drip of trees, where few other plants would grow.



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If exposed to the sun, the leaves turn back with a kind of twist; and, instead of their natural pure deep green, they assume a brownish tinge. The berries are oval, green at first, but black when ripe; and they are a favourite food of singing birds: though, as De Candolle observes in the *Flore Française*, they are poisonous to all other animals. The spurge laurel is propagated by seeds, like the mezereon; but, as they will remain two years in the ground before they vegetate, they are generally treated like haws, and kept for some time in the rotting-heap. It may also be propagated by cuttings; but not readily. It is much used in nurseries, as a stock on which to graft the more tender species of the genus; but as, like all the other daphnes, it has few roots, it requires to be transplanted with care.

■ 5. *D. PO'NTICA* L. The Pontic Daphne, or twin-flowered Spurge Laurel.

Identification. Lin. Sp. Pl., 511; Pall. Fl. Ross., 1. p. 54; Willd. Sp. Pl., 2. p. 419; Lodd. Cat., ed. 1836.

Synonymes. *Thymelæa pōntica*, citrei foliis, *Tourn. Itin.*, 3. p. 180. t. 180.; *Lauréole du Levant*, Fr.; *Pontischer Siedelbast*, Ger.

Engravings. *Tourn. Itin.*, 3. t. 180.; *Bot. Mag.*, t. 1282.; and our fig. 1184.

Spec. Char., &c. Evergreen. Leaves obovate-lanceolate, glabrous. Flowers bractless, glabrous, in many-flowered upright clusters, each of the long partial stalks of which bears two flowers. Lobes of the calyx lanceolate, long. (*Spreng.*) A native of Asia Minor, where it forms a shrub, growing to the height of 4 ft. or 5 ft., and producing its greenish yellow flowers in April and May. It was introduced in 1759, and is frequent in collections.

Varieties.

■ *D. p. 2 rubra* Hort. has red flowers, and is supposed to be a hybrid. It is rather more tender than the species.

■ *D. p. 3 foliis variegatis* Lodd. Cat., 1836, has variegated leaves.

Description, &c. The whole plant, in general appearance, strongly resembles the common spurge laurel; but the leaves are more oval, and shorter; and the flowers, which are disposed in twos instead of fives, are yellow, and of a sweeter scent. The leaves somewhat resemble those of the lemon tree, especially in colour; whence Tournefort's trivial name. When bruised, they smell like those of the elder. This fine plant was first discovered by Tournefort, on the coast of the Black Sea, on hills and in woods; and Pallas says that it is also found in Siberia, in thick woods, and in the valleys which occur between the ridges

of lofty mountains. It is, generally speaking, sufficiently hardy to bear the winters of the climate of London without protection; but, being disposed to put forth its young shoots very early, they are often injured in exposed situations, by the spring frosts; "an inconvenience which probably might be avoided by planting it in thickets, and under the shelter of trees." (*Bot. Mag.*, t. 1282.) It thrives best in soil similar to that usually prepared for American plants, on the shady side of a wall, or in some other sheltered situation, where it will form a very handsome bush, 4 ft. or 5 ft. high, and 6 ft. or 8 ft. in diameter. It may be propagated by seeds or cuttings. Plants, in the London nurseries, are 1s. 6d. each.

■ 6. *D. THYMELEA* L. The Thymelæa, or Milkwort-like, Daphne.

Identification. Vahl Symb., 1. p. 28.; Willd. Sp. Pl., 2. p. 416.

Synonymes. *Thymelæa foliis polygalæ glabris Bauh. Pin.*, 463.; *T. alpina glabra*, flosculis subluteis ad foliorum ortum sessilibus, *Pluk. Alm.*, 366. t. 229. f. 2.; *Sanamunda viridis vel glabra Bauh. Prod.*, 160.; *Sanamunda glabra Bauh. Hist.*, 1. p. 592.; *Passerina Thymelæa Dec.*; the Wild Olive; *La Thymelie*, Fr.; *astloser Seidelbast*, Ger.

Derivation. *Thymelæa* is probably derived from *thymos*, poison, and *elaia*, or *elaë*, the olive tree, in reference to the poisonous qualities of the plant, and its slight resemblance to the olive.

Engravings. Ger. Prov., t. 17. f. 2.; *Pluk. Alm.*, t. 229. f. 2.; and our fig. 1185.

Spec. Char., &c. Evergreen. Stem much branched. Branches simple, warted. Leaves lanceolate, broader towards the tip, crowded. Flowers axillary.

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sessile. (*Vahl Symb.*, 1. p. 28.) A native of Spain, and of the neighbourhood of Montpellier, where it forms a shrub 3 ft. high, flowering from February to April. Introduced in 1815; but rare in collections. The leaves are of a glaucous hue; and the flowers, which are produced in clusters on the sides of the branches, are of a yellowish green; they are inconspicuous, and they are succeeded by small berries, which are yellowish when ripe. The plant requires to be kept warm and dry; and to be grown in sandy peat, kept in an equable degree of moisture. For this reason, this and other species of *Daphne* form very suitable plants for being grown together in a daphnetum, in the same manner as the heaths in an ericetum.



7. *D. TARTON-RAIRA* L. The Tarton-raira, or silvery-leaved, Daphne.

Identification. Lin. Sp., 510; Willd. Sp. Pl., 2. p. 417; Lodd. Cat., ed. 1836.
Synonymes. *Thymelæa foliis candicantibus et serici instar mollibus Bauh. Pin.*, 463; Tarton-Raire Gallo-provinciæ Monspelienſium *Lob. Ic.*, 371; *Sanamúnda argentata latifolia Barr. Ic.*, 221; *Passerina Tarton-raira* Schrad.; the oval-leaved Daphne; Laureole blanche, Fr.; Silberblättriger Seidelbast *Ger.*
Engravings. Lob. Ic., 371; Barr. Ic., 221; Fl. Græca, t. 354; and our fig. 1186.

1186

Spec. Char., &c. Leaves persistent, obovate, nerved, silky, hoary. Flowers sessile, lateral, aggregate, imbricated with scales at the base. (*Vahl Symb.*) A native of the south of France, where it grows to the height of 3 ft., flowering from May to July. Cultivated by Miller in 1739, and now frequent in collections. This species is remarkable for the smallness and silkiness of its leaves, and the white appearance of the whole plant. The flowers are small, yellowish, sessile, and come out in thick clusters. The plant is very suitable for rockwork, as its branches are weak, irregular, and scarcely ligneous; it requires a warm dry situation, exposed to the sun. Plants, in the London nurseries, are 1s. 6d. each.



8. *D. (? T.) PUBESCENS* L. The pubescent Daphne.

Identification. Lin. Mant., 66; Willd. Sp. Pl., 2. p. 417.
Synonymes. *Thymelæa itálica*, Tarton-raire Gallo-provinciæ similis, sed per omnia major, *Micheli*, cited in *Tilli Cat. Hort. Pisani*; behaarter Seidelbast *Ger.*
Engraving. *Tilli Cat. Hort. Pisani*, t. 49. f. 2.
Spec. Char., &c. Stems pubescent, simple. Leaves linear-lanceolate, almost mucronate, alternate. Flowers axillary; 5, or fewer, in an axil; sessile, narrow, shorter than the leaf; the tube thread-shaped and downy. It seems different from *D. Thymelæa*, and was found in Austria by Jacquin. (*Willd.*) It is stated to have its leaves nearly deciduous. Introduced in 1810.

9. *D. (? T.) TOMENTOSA* Lam. The tomentose Daphne.

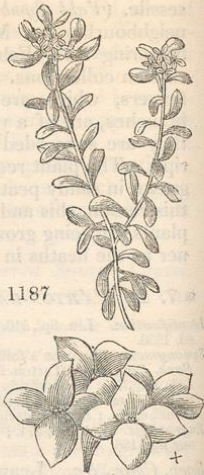
Identification. Lam. Dict.; N. Du Ham., 1. p. 26.
Synonymes. *Passerina villosa* Lin.; Laureole cotonneuse *Lam. Encyc.*, 10.
Spec. Char., &c. Flowers sessile, axillary. Leaves oblong-obtuse, covered with tomentum on both sides. (*Lam.*) A low shrub, very nearly allied to *D. Tarton-raira*, but larger in all its parts, and with more obtuse leaves, which are covered with tomentum, instead of a silky down. It is a native of Asia Minor and the Levant, and produces its white flowers in May. It was introduced in 1800, but is now probably lost.

C. Erect. Leaves persistent. Flowers terminal.

10. *D. COLLINA* Smith. The hill-inhabiting Daphne, or Neapolitan Mezereon.

Identification. Smith in Fl. Græca, t. 359; Smith Spicil., t. 18; Willd. Sp. Pl., 2. p. 423; Bot. Mag., t. 428; N. Du Ham., t. 2; Wikström Diss. de Daphnæ, p. 32; Enum., p. 9; Lodd. Cat., ed. 1836.
Synonymes. *D. collina* *Bot. Reg.*, t. 822; ? *D. buxifolia Vahl Symb.*, 1. p. 29; Daphné des Collines, Laureole à Feuilles de Santé, Fr.; Stumpfbliättriger Seidelbast, *Ger.*
Engravings. Fl. Græca, t. 359; Smith Spicil., t. 18; Bot. Mag., t. 428; N. Du Ham., t. 2; Bot. Cab., t. 1348; and our fig. 1187.

Spec. Char., &c. Leaves obovate, glabrous and glossy above, and hirsutely villous beneath. Flowers in terminal groups. Calyx externally silkily villous; its lobes ovate, obtuse. (*Wikström*, quoted in *Bot. Reg.*, t. 822.) A low shrub, with pretty pinkish blossoms. Found abundantly on low hills, and on the banks of rivers, in the south of Italy, where it grows to the height of 3 ft., and flowers from January to June. It was first discovered by Tournefort in the Isle of Candia (the ancient Crete); and afterwards by Sir J. E. Smith in the kingdom of Naples, in 1787. It was introduced in 1752, and is frequent in collections. It well deserves a place in every daphnetum. Grafted plants, grown in a border sheltered from the north by a wall, thrive well; and form thick bushes, with nearly level heads, covered with flowers. The branches always take an upright direction, and are tipped with groups of pale pink blossoms, which are extremely fragrant, and expand very early in the spring. Price of plants, in the London nurseries, 1s. 6d. each.



1187

❖ 11. *D. (C.) NEAPOLITANA* Lodd. The Neapolitan Daphne.

Identification. Lodd. Bot. Cab., t. 719; Lodd. Cat., ed. 1836.

Synonymy. *D. collina* ♂ neapolitana Lindl. in *Bot. Reg.*, t. 822.

Engravings. Lodd. Bot. Cab., t. 719; *Bot. Reg.*, t. 822; and our fig. 1188.

Spec. Char., &c. "This pretty plant is surely a mere variety of *D. collina*, from which it differs, as far as we can observe, after comparing the living plants, chiefly in the want of pubescence on the under surface of the leaves. Like many other plants with which the catalogues and floras of the present day are augmented, it is a sport of nature, which the ingenious acuteness of modern botanists have brought into notice; but which, if unmolested upon its native hills, would quickly have passed away into the type from which it sprang." (*Lindley* in *Bot. Reg.*, t. 822.) In cultivation in British gardens since 1822. 2s. 6d. each.



1188

Price of plants

❖ 12. *D. (C.) OLEÖIDES* L. The Olive-like Daphne.

Identification. Lin. Mant., 66; Schreb. Dec., 13. t. 7; Willd. Sp. Pl., 2. p. 423;

Reich., 2. p. 194; Sims in *Bot. Mag.*, t. 1917; Lodd. Cat., ed. 1836.

Synonymy. *Chamaedaphnoides cretica* *Alpin. Exot.*, 44. t. 43; *Thymela* 'a

cretica oleæ folio utriusque glabro Tourn. Cor., 41; *Daphne salicifolia* *Lam.*

Encycl., 3. p. 423; *Lauréole à Feuilles d'Olivier, Fr.*; *Oelbaumbblätteriger*

Seidelbast, Ger.

Engravings. *Alpin. Exot.*, t. 43; Schreb. Dec., 13. t. 7; *Bot. Mag.*, t. 1917;

Bot. Cab., t. 299; and our fig. 1189.

Spec. Char., &c. Leaves obovate-lanceolate, terminated with a minute mucro, glabrous upon both sides. Flowers terminal, sessile, a few together, and surrounded by leaves, that in some measure involucrate them. (*Bot. Mag.*, t. 1917.) A native of Crete, where it grows to the height of 2 ft., and produces its flowers during the greater part of the year. It is less showy in its flowers than *D. collina*, but is deserving of cultivation from its nearly glossy and pointed leaves, and neat habit of growth. It was introduced in 1815. Price of plants, in the London nurseries, 1s. 6d. each.



1189

❖ 13. *D. (C.) SERTICEA* Vahl. The silky-leaved Daphne.

Identification. Vahl Symb., 1. p. 28; Willd. Sp. Pl., 2. p. 423.

Synonymy. *Thymela* 'a *cretica oleæ folio subtus villosa Tourn. Cor.*, 41; *Daphne oleæfolia* *Lam.*

Encycl., 3. p. 424; *Seidenartiger Seidelbast, Ger.*

Spec. Char., &c. Leaves lanceolate, bluntish, glabrous above, villous beneath. Flowers terminal, aggregate, villous, sessile. Lobes of the calyx obtuse. It differs from *D. (c) oleifolia* in its leaves being villous beneath, in the number of its flowers, and in the lobes of the calyx being oblong. (*Willd.*) A native of Candia and Naples, introduced in 1820; but we have not seen the plant. *D. sericea* *Don*, noticed in p. 175, is a native of the Himalayas, and is quite a different plant from that just described.

14. *D. STRIATA* *Tratt.* The striated-calyxed *Daphne*.

Identification. *Tratt.*; *Spreng. Syst.*; 2. p. 237.

Spec. Char., &c. Leaves subspathulate-linear, sessile, tipped with a small mucro, glabrous. Flowers terminal, aggregate, sessile, glabrous, striated. Lobes of the calyx acute. A native of Switzerland and Hungary. (*Spreng. Syst.*, ii. p. 237.) This plant is said to have been introduced in 1819, and to have purplish flowers; but we have never seen it.

D. Erect. Leaves persistent. Flowers in Racemes.

15. *D. GNIDIUM* *L.* The Gnidium, or Flax-leaved, *Daphne*.

Identification. *Lin. Sp. Pl.*, 311.; *Mill. Dict.*, n. 7.; *Willd. Sp. Pl.*, 2. p. 420.; *Lodd. Cat.*, ed. 1836.

Synonymes. *Thymela a foliis lini Bauh. Pin.*, 463.; *Spurge Flax*, Mountain Widow *Wayle*; *Daphne Gnidium*, *Lauréole à Panicule, Fr.*; *Rispenblättriger Seidelbast, Ger.*
Engravings. *Lodd. Bot. Cab.*, t. 150.; and our *fig. 1190*.

Spec. Char., &c. Evergreen. Leaves linear-lanceolate, with a cuspidate tip. Flowers in terminal, paniced racemes. (*Willd.*) A native of Spain, Italy,

and Narbonne, where it grows to the height of 2 ft., and flowers from June to August. It was introduced in 1797, and is frequent in collections. An elegant little shrub, with terminal panicles of sweet-smelling pink flowers, which are succeeded by small, globular, red berries. The same deleterious properties are attributed to this shrub, as to the common mezereon. It is rather tender, but would be suitable for conservative rockwork. *Dr. Lindley* observes of this plant, that both it and *Passerina finctoria* are used in the south of Europe to dye wool yellow. (*N. S. of Bot.*) The price of plants, in the London nurseries, is 2s. 6d. each.



E. Prostrate. Leaves persistent. Flowers terminal, aggregate.

16. *D. CNEORUM* *L.* The Garland-flower, or trailing, *Daphne*.

Identification. *Lin. Sp.*, 511., *Syst.*, 371.; *Willd. Sp. Pl.*, 2. p. 422.; *Bot. Mag.*, t. 313.; *Lodd. Cat.* ed. 1836.

Synonymes. *Cnedrum Matth. Hist.*, 46., *Clus. Hist.*, 89.; *wohlriechender Seidelbast, Ger.*
Engravings. *Jacq. Aust.*, 5. t. 426.; *Bot. Mag.*, t. 313.; *Bot. Cab.*, t. 1800.; and our *fig. 1191*.

Spec. Char., &c. Evergreen. Stems trailing. Leaves lanceolate, glabrous, mucronate. It flowers twice a year. The flowers are terminal, aggregate, sessile, red upon the upper side, and the groups of them are surrounded by leaves. (*Willd.*) It is wild in Switzerland, Hungary, the Pyrenees, Mount Baldo, Germany, and France, where it grows a foot high, and flowers in April and September.

Varieties.

1. *D. C. 2 foliis variegatis.* — The leaves have a narrow portion of yellow at the edges.

2. *D. C. 3 flore albo.* — *Clusius*, in his *Hist.*, has stated that the species varies with white flowers. (*Willd. Sp. Pl.*)

Description, &c. This plant is seldom more than a foot high, but it is ornamented by numerous pinkish flowers, which are disposed in terminal umbels, and are remarkably fragrant. The berries are white, small, and globose, but they are seldom produced in England. The plant is valuable for rockwork, and growing in pots, on account of its dwarf habit,



and the beauty and delightful fragrance of its flowers. It is commonly propagated by layers, and it thrives best in peat soil, kept rather moist.

App. i. *Half-hardy Species of Daphne.*

✱ *D. odora* Thunb. Fl. Jap., 159, Banks Ic. Kämpf., t. 16, Ait. Hort. Kew., ii. p. 26, N. Du Ham., 1. p. 28, Lodd. Cat., ed. 1836; *D. sinensis* Lam. Dict.; the sweet-scented Daphne, Laursole de Chine, Daphné odorant, Fr.; wohlriechender Seidelbast, Ger.; has the leaves lanceolate, thin, and glabrous; and the flowers terminal and sessile. (*Lois.* in N. Du Ham., l. p. 28.) It is a native of China and Japan, which was introduced into Britain in 1771, and forms an erect shrub, greatly resembling *D. ponicica* in general appearance. The branches are glabrous, and the flowers, which are disposed in terminal umbels, are remarkably sweet. The flower buds are pink in their exterior, and the petals of the flowers, after expansion, are pink on the outside, though they are white within. *D. odora* was first brought to England by Benjamin Torrens, Esq., and being confounded with the *D. indica* of Linnaeus, from which it differs in having sessile flowers and alternate leaves, it was at first kept in the stove. By degrees it was tried in a green-house, and is now found to stand in the open air in sheltered situations. Du Hamel classes it with the myrtle and the orange as to hardiness. There is a plant in the Horticultural Society's Garden, which has stood out since 1832.

Varieties.

✱ *D. o. 2 variegata* Lodd. Cat., ed. 1836, has variegated leaves, and quite white flowers.

✱ *D. o. 3 rubra* D. Don, Brit. Fl. Gard., 2d ser., t. 320, and our fig. 1192, has lanceolate leaves, and flowers of a rich deep pink colour. The flowers are produced at the extremities of the shoots; "they are of a dark red in the bud state, but become paler and glossy after expansion, and they are then highly fragrant." There are plants in the nursery of Mr. G. Smith, at Islington, which appear very nearly hardy, having borne a considerable degree of frost without protection. (See *Gard. Mag.*, xii. p. 75.)

✱ *D. hybrida* Swt. Brit. Fl. Gard., 1st ser. t. 200., Bot. Reg. t. 1177., and our fig. 1193; the *D. delphinia* of the French gardeners; and the *D. daurica* of the English gardeners; has the branches pubescent when young, but afterwards becoming glabrous. Leaves alternate, oblong-elliptic, glossy above, and pubescent beneath. Flowers in terminal groups, nearly sessile, and covered on the outside with silky hairs. (*Swt. Brit. Fl. Gard.*) This is a highly esteemed kind, and one that is much propagated in the London nurseries. It grows freely, has large handsome glossy leaves, and produces its purplish flowers, which have a most delightful fragrance, in great abundance. It is supposed to be a hybrid between *D. collina* and *D. odora*; but it is not known when, or by whom, it was originated. It is generally kept in the green-house, but would succeed perfectly in the open air, if planted in light sandy soil, against a south wall where it could be protected in very severe weather. It flowers under glass in February, but would probably be a month or six weeks later in the open ground. (*Sweet and Lindl.*)

✱ *D. indica* L., the Indian or Chinese daphne, is a small shrub, with acute entire leaves, and terminal sessile flowers. Introduced in 1800, but much more tender than either of the preceding species.

✱ *D. papyracea* Wal., *D. cannabina* Wal., is a Nepal species, from the inner bark of which a sort of paper has been made in India. It was introduced in 1824.



1912



1193

GENUS II.



DIRCA L. THE DIRCA, or LEATHER-WOOD. Lin. Syst. Octándria Monogýnia.

Identification. Lin. Amen. Acad., 3. p. 12; N. Du Ham., vol. iii. p. 193.; Bot. Reg., t. 292.

Synonyme. Thymeke'a Gron. Virg., 155.

Derivation. From *dirke*, a fountain; from the plant growing in watery places.

✱ I. D. PALUSTRIS L. The Marsh Dirca, or Leather-wood.

Identification. Lin. Amen. Acad., 3. p. 12.; Willd. Sp. Pl., 2. p. 424.; Bot. Reg., t. 292.; N. Du Ham., iii. p. 193.; Lodd. Cat., ed. 1836.

Synonymes. Moorwood; Bois de Cuir, Bois de Plomb, Fr.; Sump. Lederholz Ger.

Engravings. Lin. Amen. Acad., 3. t. 1. f. 7.; Du Ham. Arb., 1. t. 212.; Bot. Reg., t. 292.; and our fig. 1194.

Description, &c. A low deciduous shrub with the habit of a miniature tree, a native of Virginia, where it grows about 5 ft. or 6 ft. high, producing its yellow flowers in March and April. It was introduced in 1750, and is common in collection of peat-earth shrubs. It has a branchy and fastigiate habit, and has a tumidity at the base of each branch on the under side. The bark is brown and glabrous. Linnæus has remarked that the wood and bark are so tough, that it is scarcely possible to divide the substance of either without a knife, and this quality has obtained for the plant the English name of leather-wood. The leaves are lanceolate, oblong, alternate, of a pale green, villous beneath, and deciduous. The flowers are produced while the plant is leafless, and, in England, they are seldom, if ever, followed by seeds. The bud of the shoot of the same year is enclosed in the bud of the inflorescence. The young plants are very liable to be eaten by snails. (*Bot. Reg.*) Though quite a tree in its habit of growth, it is rarely seen in England above 3 ft. high. In Canada, the twigs are used for rods, and the bark for ropes, baskets, &c., for which it is very suitable, being equal in strength and toughness to the bark of the lime tree. In British gardens, *D. palustris* is propagated by layers, which require two years to root properly. The soil in which the plant grows best is peat kept moist. Price of plants, in the London nurseries, 5s. each; at Bollwyler, 3 francs; and at New York, 25 cents.



App. I. *Half-hardy ligneous Plants belonging to the Order Thymelæcæ.*

Gnidia imbricata L.; *G. denudata* *Bot. Reg.*, t. 757.; has grey villous leaves, and pale yellow flowers. There were plants of this species in Knight's Exotic Nursery, King's Road, Chelsea, in 1830, one of which was upwards of 4 ft. high.

Passerina filiformis L. is a plant well known in old collections. It is a native of the Cape of Good Hope, which was introduced in 1752; and in a conservatory it will grow to the height of 8 ft. It has slender, twiggly, spreading branches, which have the leaves imbricated along their terminal parts in 4 rows. It bears its white flowers plentifully on the terminal parts of the branches. Nearly all the species of *Passerina* are low shrubs, natives of the Cape of Good Hope, which might probably stand out against a conservative wall.

Pimelia drupacea Lab., *Bot. Cab.*, t. 540., the cherry-fruited pimelea, is tolerably hardy. It is an evergreen shrub, about 2 ft. high, a native of New Holland, which was introduced in 1817. Its flowers, which are white, are produced in May, and they are succeeded by a berry-like sessile fruit, which is quite black when ripe, and has a striking appearance on the plant when produced abundantly.

CHAP. XCVI.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER SANTALACEÆ.

THE only hardy genus is *Nýssa* L., to which the following character belongs:—

Nýssa L. Flowers bisexual and male: the two kinds upon distinct plants, and without petals.—Bisexual flower. Calyx connate, with the ovary in its lower part; it has a free 5-parted limb. Stamens 5. Ovary ovate, containing 1 pendulous ovule (2 in some instances, *Nuttall*). Style simple, revolute (curved inwards, Rees's *Cyclop.*). Stigma acute. Fruit a roundish drupe: nut elliptical, acute, angular, somewhat irregular, grooved lengthwise, contain-

ing 1 seed which is albuminous, and has an embryo that has large leafy cotyledons and a superior radicle. — Male flower. Calyx 5-parted, spreading. Stamens 5, 8, 10, and 12; surrounding a shield-shaped gland (? an unformed pistil). — Trees. Leaves alternate, entire. Inflorescence axillary, peduncled, of 1 flower, or several aggregate flowers. ? The male flowers in a corymb. Fruit red or blackish purple, suffused with a frosty appearance. (*Nutt. Gen., Lindl. N. S. of Bot., Rees's Cycl.*, other sources, and observation.)

OSYRIS L. Flowers apetalous, unisexual, at least in effect; those of the 2 sexes upon distinct plants. — Male. Flowers borne in lateral racemes, about 3—5 in a raceme, and disposed in 1—2 pairs, with a terminal odd one. Calyx spreadingly bell-shaped, 3-parted; its æstivation valvate. Nectary disk-like, 3-cornered. Stamens 3, arising from the nectary, alternate to its angles, and opposite to the lobes of the calyx; anthers of 2 separate lobes that open inwards. (*T. Nees ab E.*) Scopoli (*Fl. Carn.*) has seen the rudiments of an ovary, and of styles, in the male flower. (*Willd. Sp. Pl.*) — Female. Flowers solitary. Calyx urceolate; its tube connate with the ovary; its limb free, 3-cleft. Style single. Stigmas 3. There are not any rudiments of stamens. (*T. Nees ab Esenb.*) Rather the flower is bisexual, but it does not bear seed unless a male plant is contiguous. (*Willd. Sp. Pl.*) Fruit globose, fleshy exteriorly, crowned by the limb of the calyx, and the remains of the style. Carpel with crustaceous, brittle walls. Seed affixed by its base. Embryo incurved, in the centre of fleshy albumen.—*O. álba L.*, the only known undisputed species, is a shrub with twiggly branches, alternate, linear-lanceolate, small leaves, white flowers, and red fruit. (*T. Nees ab Esenbeck Gen. Pl. Flora Germanicæ.*)

GENUS I.



NYSSA L. THE NYSSA, or TUPELO TREE. *Lin. Syst. Polygámia Dice'cia;* or rather, according to Smith in Rees's *Cyclopædia*, Decándria Monogýnia.

Identification. *Lin. Gen.*, 551.; *Lin. Gen.*, ed. Schreb., No. 1599.; *Willd. Sp. Pl.*, 4. p. 1112.; *Mill. Dict.* v. 3.; Rees's *Cyclop.*
Derivation. From *Nyssa*, a water nymph so called; a name given to this plant by Linnæus, because "it grows in the waters." (*Hort. Cliff.*) Tupelo appears to be an aboriginal name.

Description, &c. Deciduous trees, natives of North America, and, though several sorts have been described by botanists, probably all referable to two, or at most three, species: viz. *N. biflora*, *N. cándicans*, and *N. tomentosa*, the last two being very nearly allied. In the case of *Nyssa*, as in those of *Fraxinus* and *Quercus*, there are seeds of several alleged species procured from America; and though plants from these may come up tolerably distinct, we do not consider that circumstance sufficient to constitute each sort a species. The trees of this genus are of little use for their timber; but the fruit of *N. cándicans*, *N. tomentosa*, and *N. denticulata*, gathered a little before maturity, and preserved with sugar, forms an agreeable conserve, tasting somewhat like cranberries. (*Nuttall Gen.*) In British gardens, two or three of the sorts occasionally occur; but they are not common in collections. The largest *nyssa* that we know of in England is at Richmond, where, in 1836, it was 45 ft. high. The trees which have flowered in England have, as far as we are aware, only produced male blossoms; but, to compensate for the want of fruit, the foliage of all the species of the genus dies off of an intensely deep scarlet. The different sorts are almost always raised from seeds; and seeds with the names of *N. denticulata*, *N. tomentosa*, *N. aquatica* (*N. biflora*), *N. cándicans*, and *N. sylvatica*, according to Charlewood's *Catalogue* for 1836, are sold at 1s. a packet. Plants, in the London nurseries, are 2s. 6d. each; at Bollwyller 2 francs; and at New York, from 25 cents to 1 dollar.

¶ 1. N. BIFLORA Michx. The twin-flowered Nyssa, or Tupelo Tree.

Identification. Michx. Fl. Bor. Amer., 2. p. 259; Willd. Sp. Pl., 4. p. 1113.
Synonymes. N. aquatica Linn. Sp. Pl., 1511, Hort. Cliff., 462., Du Roi Harbk., 1. p. 44., Michx. N. Amer. Syl., iii. p. 36.; N. caroliniana L.; N. integrifolia Ait. Hort. Kew., 3. p. 446., Smith in Rees's Cyclop.; N. pedunculis multifloris Gron. Virg., 121.; Mountain Tupelo, Mart. Mill.; Gum Tree, Sour Gum Tree, Paperidge, Amer.
Engravings. Catesb. Car., 1. t. 41.; Pluk. Alm., t. 172. f. 6.; and our figs. 1195, 1196.

Spec. Char., &c. Leaves ovate-oblong, entire, acute at both ends, glabrous. Female flowers two upon a peduncle. (Willd. Sp. Pl., iv. p. 1113.) The drupe is short and obovate, and the nut striated. (Michaux.) A deciduous tree, a native of Virginia and Carolina, in watery places, where it grows to the height of 40 ft. or 45 ft.; flowering in April and May. It was introduced in 1739, and is one of the most common sorts in British collections. The tupelo tree is most abundant in the southern parts of New York, New Jersey, and Pennsylvania, where it grows only in wet ground; having a clear stem, of a uniform size, from the base to the height of 5 ft. or



6 ft., where it throws out horizontal branches. On old trees the bark is "thick, deeply furrowed, and, unlike that of every other tree, divided into hexagons, which are sometimes nearly regular." (Michx. N. Amer. Syl., iii. p. 37.) The leaves are smooth, slightly glabrous below, and often united in bunches at the extremity of the young lateral shoots. The flowers are small, and scarcely apparent; but the fruit, which is always abundant, and attached in pairs, is of a deep blue colour, and is ornamental, remaining on the tree after the falling of the leaf, and affording food for birds. "The tupelo holds a middle place between trees with hard and those with soft wood. When perfectly seasoned, the sap-wood is of a light reddish tint, and the heart-wood of a deep brown. Of trees exceeding 15 in. or 18 in. in diameter, more than half the trunk is hollow." (Michx.) The timber of the tupelo is of little value, but, from its peculiar organisation (the fibres being united in bundles, and interwoven like a braided cord), it is extremely difficult to split. It is on this account much esteemed in America for wooden bowls. As fuel, it burns slowly, and diffuses a great heat. "At Philadelphia, many persons, when making their provision of wood for the winter, select a certain proportion of the tupelo, which is sold separately, for logs." (Michx.) In British gardens it does not appear that much pains have ever been taken to encourage the growth of this or any other species of Nyssa; for though there are abundance of plants to be procured in the nurseries, yet there are very few of a tree-like size to be seen in pleasure-grounds. The largest tupelo tree that we know of in England is at the Countess of Shaftesbury's villa at Richmond, where it is 45 ft. high, and has a trunk 1 ft. 4 in. in diameter. There are, also, a tree in Lee's Nursery 20 ft. high; one in the grounds of the villa of the late Mr. Vere, at Kensington Gore, about 15 ft. high; one at the Duke of Wellington's, at Strathfieldsaye, 30 ft. high; and some at White Knights; from all of which, except that at Lady Shaftesbury's, we have received specimens when in flower, and all these were male blossoms. At Schwöbber, in Hanover (see p. 148.), there is a nyssa 40 ft. high. To insure the prosperity of the tree, it ought always to be planted in moist peat, or near water. The trees at Strathfieldsaye and at Schwöbber are in moist meadows, on a level with the water of adjoining rivers.

¶ 2. N. (B.) VILLOSA Michx. The hairy-leaved Nyssa, or Tupelo Tree.

Identification. Michx. Fl. Bor. Amer., 2. p. 258; Willd. Sp. Pl., 4. p. 1112.; Pursh Fl. Amer., Sept., 1. p. 177.
Synonymes. N. sylvatica Mich. N. Amer. Syl., 3. p. 33.; Lodd. Cat., ed. 1836; N. multiflora Wangenh. Amer., 46. t. 16. f. 39.; N. montana Hort.; N. pedunculis multifloris Gron. Virg., 121.; Sour Gum Tree, Black Gum, Yellow Gum, Amer.; haariger Tulpeobaum, Ger.
Engravings. Wangenh. Amer., t. 16. f. 39.; Michx. N. Amer. Syl., 3. t. 110.; and our figs. 1197, 1198.

Spec. Char., &c. Leaves oblong, entire, acute at both ends; with the petiole, midrib, and edge villous. Female flowers, about three upon a peduncle. (*Willd. Sp. Pl.*, iv. p. 1113.) Peduncle of female flowers long, and for the most part two-flowered. Nut



1198

small, ovate, obtuse, striated. (*Michx.*) A deciduous tree, a native of North America, where it grows from 60 ft. to 70 ft. high, and flowers in April and May. It was introduced in 1824, and is occasionally to be met with in collections. *N. sylvatica Michx.*, which we have made synonymous with *N. villosa*, on the authority of Pursh (see *Fl. Amer. Sept. Addenda*, ii. p. 175.), is said by Michaux to exhibit a remarkable singularity in its vegetation. "In Maryland, Virginia, and the western states," he observes, "where it grows on high and level ground with the oaks and the walnuts, it is distinguished by no peculiarity of form: but in the lower part of the Carolinas and of Georgia, where it is found only in wet places, with the small magnolia or white bay (*Magnolia glauca*), the red bay (*Laurus carolinensis*), the loblolly bay (*Gordonia Lasianthus*), and the water oak (*Quercus aquatica*), it has a pyramidal base, resembling a sugar loaf; a trunk 18 ft. or 20 ft. high, and 7 in. or 8 in. in diameter, at the surface of the ground; which, a foot higher, is only 2 in. or 3 in. thick; the proportions, however, varying in different individuals." (*N. Amer. Syl.*, iii. p. 34.) This tree appears to differ very little from *N. biflora*, except in the greater height attained by the tree, and in the downiness of the petioles of the leaves. The fruit is of the same size and colour, generally produced in pairs on similar peduncles, and the wood is of the same description, fine-grained, but tough. "The alburnum of the trunks of trees growing upon dry and elevated lands is yellow; and this colour, being considered by wheelwrights as a proof of the superior quality of the wood, has probably given rise to the name of yellow gum, which is sometimes applied to this species." (*Ibid.*) The wood is used for all purposes, for which timber is required of moderate dimensions, which is not liable to split. The only plant which we have seen of this kind is in the arboretum of Messrs. Loddiges, where, in 1835, it was 10 ft. high, and had produced male blossoms; but it died in the spring of 1836, apparently from the soil being too dry.

‡ 3. *N. CAÑDICANS Michx.* The whitish-leaved Nyssa, or Ogechee Lime Tree.

Identification. Michx. Fl. Bor. Amer., 2. p. 259.; Willd. Sp. Pl., 4. p. 1113.
Synonymes. *N. capitata Walt., Ait. Hort. Kew, Michx. N. Amer. Syl.*, 3. p. 43.; *N. coccinea Bartram;* Sour Tupelo Tree, Ogechee Lime Tree, Wild Lime; weisslicher Tulpebaum, Ger.
Engravings. Michx. N. Amer. Syl., 3. t. 113.; and our fig. 1199.

Spec. Char., &c. Leaf with the petiole very short, and the disk oblong, wedge-shaped at the base, nearly entire, whitish on the under surface. Female flowers one upon a peduncle. (*Willd. Sp. Pl.*, iv. p. 1113.) It varies, with its leaves obovate, entire, or rarely subdentate. The male flowers are grouped into little heads. The bractees attending the female flowers are short; the calyx of these flowers is tomentose; its lobes are short. The drupe is oblong. (*Michaux.*) A deciduous tree, a native of Carolina, on the banks of rivers, particularly the Ogechee.



1199

It is the smallest tree of the genus, rarely exceeding 30 ft. in height. It was introduced in 1806.

The leaves are 5 in. or 6 in. long, oval, rarely denticulated, of a light green above, and glaucous beneath. The flowers are similar to those of the large tupelo (*N. grandidentata*), but the sexes are borne by separate trees; and Michaux remarks, "as a peculiarity witnessed in no other tree of North America, that the male and female trees are easily distinguished by their general appearance when the leaves have fallen. The branches of the male are more compressed about the trunk, and rise in a direction more nearly perpendicular; those of the female diffuse themselves horizontally, and form a larger and rounder summit. The fruit is supported by long peduncles, and is about 1½ in. in length, of a light red colour, and of an oval shape. It is thick-skinned, intensely acid, and contains, like that of the large tupelo, a large oblong stone, deeply channeled on both sides." (*Michx. N. Amer. Syl.*, iii. p. 43, 44.) This appears to be the kind of *Nyssa* mentioned in Martyn's *Miller*, as not then introduced, but which is said to be described by Mr. Humphry Marshall, from Bartram's catalogue, "as a tree of great singularity and beauty, rising to the height of 30 ft.; the fruit of which is of a deep scarlet colour, and of the size of a damascene plum. It has an agreeable acid taste, whence it is called the lime tree." Professor Martyn adds that Bartram calls it *Nyssa cocćinea*, and observes that there is no tree which exhibits a more desirable appearance than this, in the autumn, when the fruit is ripe, and the tree is partly divested of its leaves; for then "the remainder looks as red as scarlet, and the fruit is of that colour also." It is the shape of the olive, but larger, and contains an agreeable acid juice. "The most northern habitation of this tree yet known," he adds, "is on the great Ogechee, where it is called the Ogechee lime, from its acid fruit being about the size of limes, and being sometimes used in their stead." There is a plant, bearing the name of *N. capitata*, in the arbo-retum of Messrs. Loddiges, 6 ft. or 7 ft. high; which, from its foliage, we have no doubt, is identical with Michaux's figure.

‡ 4. *N. GRANDIDENTATA* Michx. The deeply-toothed-leaved *Nyssa*, or Large Tupelo Tree

Identification. Michx. *N. Amer. Syl.*, 3. p. 40.
Synonymes. *N. tomentosa*, and *N. angulizans*, Michx. *Fl. Bor. Amer.*, 2. p. 259; *N. denticulata* Ait. *Hort. Kew.*, 3. p. 446.; Willd. *Sp. Pl.*, 4. p. 1114; *N. angulosa* Poir.; *N. uniflora* Wangeh. *Amer.*, p. 83.; *Wild Olive, Amer.*; *Virginian Water Tupelo, Mart. Mill.*
Engravings. Wangeh. *Amer.*, t. 27. f. 57.; Catesb. *Car.*, 1. t. 60.; Michx. *N. Amer. Sylva*, 3. t. 112.; and our figs. 1200, 1201.

Spec. Char., &c. Leaf with a long petiole, and a disk that is oblong, acuminate, distantly serrate. Female flowers one upon a peduncle. (*Willd. Sp. Pl.*, iv. p. 1114.) The leaves are invariably toothed with large pointed teeth. The bractees are rather longer than the ovary. The lobes of the calyx are wedge-shaped. The drupe is oblong (*Michaux*). A deciduous tree, a native of North America; which Michaux calls the most remarkable species of its genus for height and diameter; and which was introduced into Britain in 1735. It grows chiefly in the southern parts of the United States; and Michaux observes that it is always found in company with the long-leaved pine (*Pinus palustris*) and the cypress (*Taxodium distichum*). In South Carolina and Georgia these trees are constantly found growing with the over-cup oak (*Quercus lyrata*), the water locust (*Gleditschia monosperma*), the cotton wood (*Populus canadensis*), the Carolinian poplar (*Populus angulata*), and the water bitter-nut hickory (*Carya aquatica*); intermixed with which they compose the dark impenetrable forests which cover the miry swamps on the borders of the rivers, to the distance of 100 to 200 miles from the ocean. The presence of these trees is considered an infallible proof of the depth and fertility of the soil, and, consequently, of its fitness

for the culture of vine. "The rivers, at their annual overflowing, sometimes cover these marshes to the height of 5 ft. or 6 ft., as is shown by the marks left upon the trees by the retreating waters. Vegetation seems only to acquire new energy from these inundations, and the large tupelo sometimes attains the height of 70 ft. or 80 ft., with a diameter of 15 in. or 20 in. immediately above its conical base, and 6 ft. or 7 ft. from the ground. This size continues uniform to the height of 25 ft. or 30 ft. At the surface the trunk is 8 ft. or 9 ft. thick. (*Michx. N. Amer. Syl.*, iii. p. 41.) The leaves of the large tupelo are commonly 5 in. or 6 in. long, and 2 in. or 3 in. broad; but on young and thriving plants they are of twice these dimensions. They are of an oval shape, and are garnished with two or three large teeth, which are irregularly placed, and generally only on one side of the leaf. When the leaves unfold in spring, they are downy; but they become smooth on both sides as they expand. The flowers are numerous though single, and are succeeded by fruit of considerable size, and of a deep blue colour, of which the stone is depressed, and very



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distinctly striated. The wood is extremely light and soft; and as, in the arrangement of its fibres, it resembles other species of the same genus, it is employed for making bowls and trays. The roots, also, are tender and light, and they are used by fishermen to buoy up their nets with, instead of cork. (*Ibid.*) This species is described in Martyn's *Miller* as the Virginian water tupelo tree, rising, with a strong upright trunk, to the height of 80 ft. or 100 ft., and dividing into many branches towards the top. The drupes, Professor Martyn adds, "are nearly the size and shape of small olives, and are preserved as that fruit is, by the French inhabitants of the Mississippi, where this species of *Nyssa* greatly abounds, and is called the olive tree. The timber is white and soft when unseasoned, but light and compact when dry; which renders it very proper for bowls, &c." It sometimes varies, in having the leaves quite glabrous, and less deeply toothed.

GENUS II.

OSYRIS L. THE OSYRIS, or POET'S CASIA. *Lin. Syst. Diœcia Triándria.*

Identification. *Lin. Gen. Pl.*; *Willd. Sp. Pl.*, 4. p. 715.

Synonyme. *Casia Camer., Lob., Alpin., Gesn.*

Derivation. The *Osuris* of Pliny and Dioscorides is so named from *ozos*, a branch; from the length and pliability of the branches.

* 1. *O. ALBA* L. The white-flowered Osyris, or *Poet's Casia*.

Identification. *Lin. Sp. Pl.*, 1450; *Willd. Sp. Pl.*, 4. p. 715; *Roy. Lugdb.*, 202; *Sauv. Monsp.*, 56; *Gouan Monsp.*, 502; *Gron. Orient.*, 308; *Mill. Dict.*, No. 1; *Scop. Carn.*, No. 1215.

Synonymes. *O. foliis linearibus acutis Lafl. It.*, 169; *O. frutescens baccefera Bauh. Pin.*, 212; *Casia poetica Monspelîensium Cam. Epit.*, 26, *Lob. Ic.*, 432; *Casia Latinorum Alp. Exot.*, 41; *Casia Monspelîi dicta Gesn. Epit.*, 50; *weisse Osyris, Ger*

Engravings. *Lam. Ill.*, t. 802; *T. Nees ab Esenbeck Gen. Plant. Fl. Ger. Ic. et des Illust.*, t. 20; and our *fig.* 1202.

Spec. Char., &c. A shrub 3—4 ft. high. Stem roundish, striated. Leaves alternate, linear-lanceolate, 1 in. long, entire, glabrous. Flowers upon the branchlets, peduncled. Drupe red, of the size of a pea. (*Willd.*) A native of Italy, Spain, Montpellier, Libanus, and Carniola. Introduced in 1793, and cultivated by Miller; but we have not seen the plant. The long supple branches of this tree were formerly used for brushes, and they are still used in making crates, or packing-cases in the south of Europe. It is celebrated by Keats for the whiteness of its flowers:—

“A dimpled hand,
Fair as some wonder out of Fairy-land,
Hung from his shoulder: like the drooping flowers
Of whitest casia, fresh from summer showers.”

Poems, p. 24.



CHAP. XCVII.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER ELEAGNA'CEÆ.

THEY are included in three genera, *Elæagnus* *Tourn.*, *Hippóphæ* *L.*, and *Shephérdia* *Nutt.*; and these have the following characters:—

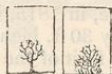
ELEAGNUS *Tourn.* Flowers, some bisexual; some, in result, male only; both kinds upon one plant.—Bisexual flower. Calyx resembling, internally, a corolla; tubular below, bell-shaped above, with a slightly spreading, lobed, deciduous limb; the lobes mostly 4; the tubular part includes, but is not connate with, the ovary and part of the style, and bears at its mouth a conical crown, through which the style passes. Style long. Stigma clavate or coiled. Stamens arising from the bottom of the bell-shaped part, shorter than it, alternate with its lobes, the filaments adnate to it, except at their tip. Ovary oblong. Ovule 1. Fruit consisting of an achenium, and of the tubular part of the calyx rendered fleshy, and including the achenium. Seed erect. Embryo erect.—Male flower. Calyx resembling, internally, a corolla, bell-shaped; it has a limb of 4—6—8 lobes. Stamens of the number of the lobes; otherwise as in the bisexual flower. A conical crown

surrounds the style of an abortive pistil. — Species several; arborescent or shrubby; inhabitants of Ceylon, Nepal, Japan, south of Europe, and North America. The fleshy part of the fruit is, in some, eatable. Leaves alternate, entire, bearing, as does the bark of growing shoots, scales, or stars of hairs. Flowers axillary, pediceled. (Chiefly *T. Nees ab Esenbeck, Gen. Pl. Fl. Germ.*, whose elucidation relates to *E. angustifolia L.*; *Lindley*; and *Ach. Rich.*)

HIPPOPHAE L. Flowers unisexual, those of the two sexes upon distinct plants. — Male flower. Calyx arched, seeming as if constituted of 2 leaves connate at the tip. Stamens 4, not extended out of the calyx. — Female flower. Calyx tubular, cloven at the top, including the ovary, and becoming eventually succulent. Ovary of 1 cell. Ovule 1. Style short. Stigma long, with a longitudinal furrow. Fruit consisting of a polished achenium, that has a slight furrow on one side, and of the calyx, now enlarged, and succulent with an acid juice. Seed erect. Embryo erect. — Two species are known, one wild in Europe, the other in Nepal. The European one is partially spiny. Both have leaves narrow, entire, scaly, and silvery, especially beneath. The succulent part of the fruit is eatable. (*T. Nees ab Esenbeck, Gen. Pl. Fl. Germ.*; *Smith, Eng. Flora*; and obs.)

SHEPHERDIA Nutt. Flowers unisexual; those of the two sexes upon distinct plants. — Male flower. Calyx 4-cleft. Stamens 8, included, as to length, within the calyx; alternate with 8 glands. — Female flower. Calyx bell-shaped, its limb 4-parted, flat, the portions equal; its tube ? adnate to the ovary. Ovule 1. Style 1. Stigma oblique. Fruit as in *Hippophae*. — Two species are known, both natives of North America, and having the aspect of *Elæagnus*; one a small tree, the other a shrub. Their leaves are entire, and bear scales. Male flowers ? laterally aggregate, in groups that resemble a catkin. Female flowers smaller than the male ones, shortly pedunculate (*Nutt. Gen.*): racemose at the ends of the branches (*Lindley in Encyc. of Pl.*; *Nuttall.*).

GENUS I.



ELÆAGNUS Tourn. THE ELÆAGNUS, OLEASTER, or WILD OLIVE TREE. *Lim. Syst. Tetrândria Monogýnia.*

Identification. Tourn. Cor., 51.; Ach. Rich. Monogr., p. 26.; T. Nees ab Esenbeck, Gen. Pl. Fl. Germanicæ; N. Du Ham., 2. p. 87.

Synonymes. Chalef, Fr.; Wilde Oelbaum, Ger.

Derivation. "The *elaïgnos* of Theophrastus was a plant with hoary leaves, growing in marshy places in Arcadia, and was probably a species of *Salix*, although certainly not *S. babýlonica*, as Sprengel has stated it to be. It was named from its resemblance to the *elaia*, or olive, from which it differed in not bearing fruit. Dioscorides writes *elaïgnos*, which means the wild olive; and some botanists have adopted this reading, which is most likely the true one. The plants to which the name *Elæagnus* is now applied are also something like the olive. The French call the *Elæagnus*, *chalef*; a slight alteration, according to Golius, of *khaléf*, the Arabic name of the willow; but more probably of *kalaf*, the Persian name of the *Elæagnus* itself." (*Lindley in Bot. Reg.*, t. 1156, adapted.) *Oleaster* is a Latin word, which is interpreted a wild olive tree; and perhaps it is derived from *olea*, an olive tree, and *instar*, likeness.

Description, &c. Deciduous shrubs, or low trees; natives of the south of Europe, the Levant, the Himalayas, and North America. In British gardens, there are two or three species which grow freely in any soil tolerably dry, and are readily propagated by seeds, layers, or cuttings.

‡ 1. *E. HORTE'NSIS Bieb.* The Garden Elæagnus, Oleaster, or Wild Olive Tree.

Identification. Bieb. Fl. Taur. Cauc., p. 113.

Synonymes. *E. angustifolia L.*, Willd. Sp. Pl., 1. p. 688., *Rœm. et Schult. Syst. Veg.*, 3. p. 478., *Pall. Fl. Ross.*, p. 10. t. 4., *N. Du Ham.*, 2. p. 87., *Bot. Reg.*, t. 1156.; *E. inermis Mill. Dict.*, No. 2.; *E. argenteus March Meth.*, p. 638.; *E. orientalis Delisle*; ? *E. argentea Wats. Dend. Brit.*, t. 161.; Jerusalem Willow; *Olivier de Bohême, Chalef à Feuilles étroites, Fr.*; *schmalblättriger Oleaster, Ger.*

Engravings. Pall. Ross., 1, t. 4.; N. Du Ham., 1, t. 89.; Bot. Reg., t. 1156.; our fig. 1203., and the plate in our last Volume.

Spec. Char., &c. A tree, growing to the height of from 15 ft. to 20 ft. Leaves lanceolate, hoary all over, as are the shoots of the current year, with stars of hairs of a hoary colour. Branches brown and smooth, more or less spiny. Leaves 2—3 in. long; upon the upper surface whitish green, and upon the under one very hoary. Flowers 2 or 3 together, axillary, upon short peduncles, fragrant; bisexual flower 4-cleft, interior of a pale yellow; male ones 5 or more cleft, interior of a golden yellow. Both are furnished on the exterior with stars of hairs, like the under surface of the leaves. Fruit of a red-brown colour, something like a small date. A native of the south of Europe, in Bohemia, France, Spain, the Levant, Tartary, and various parts of Asiatic Russia; flowering in May, and ripening its fruit in August. It was introduced in 1633, and is frequent in collections. The silvery whiteness of the foliage of this tree renders it a most conspicuous object in plantations; and hence, in any view where it is wished to attract the eye to a particular point, it may be usefully employed. For example, suppose a villa surrounded by grounds perfectly flat, with a boundary strip of plantation, or shrubbery, in the middle distance, a monotonous third distance, in which there is no object of interest but the spire of a church, and that scarcely perceptible over the tops of the trees of the plantation: plant one or two trees of *elæagnus* in that part of the plantation over which the eye sees the spire, and they will, by the light colour of their foliage, attract the eye in that direction. This tree, which is called by the Portuguese the tree of Paradise, is also remarkable for the fragrance of its blossoms, which are produced in great abundance in May, and perfume the air for a considerable distance around. For this reason it is a most desirable tree for a lawn or shrubbery. There are good specimens in the Horticultural Society's Garden; but the finest trees that we have seen, were, in 1815, in the grounds of Malmaison, near Paris, where they were nearly 30 ft. high, and with heads nearly as much in diameter. In the Levant, the fruit of the cultivated varieties, *E. h. orientâlis* and *dactylifôrmis*, is made into preserves, and also dried like pistachia nuts. The plant requires a sheltered situation, and, to attain any size, must be planted in a good soil. Price of plants in the London nurseries, 2s. 6d. each; at Bollwyller 1 franc 50 cents; and at New York, 1 dollar.



Varieties. Bieberstein, in his *Fl. Taur. Cauc.*, i. p. 112, 113., as quoted in *Ram. et Schult. Syst.* and *Bot. Reg.*, has comprehended under one species several forms, some of which are treated of as specifically distinct by Linnæus and other botanists. He gives *E. horténsis* as the name of the species, which he considers to exist under the four following forms:—

✕ *E. h. 1 angustifolia* Bieb., *E. angustifolia* L.—Leaves lanceolate, shining. Fruit insipid. This is the most common sort in British gardens. There is a tree of it in the Horticultural Society's Garden, 20 ft. high; and one at Kew, 8 ft. high.

✕ *E. h. 2 dactylifôrmis*.—Leaves lanceolate, shining. Fruit date-shaped, eatable.

✕ *E. h. 3 orientâlis*, *E. orientâlis* L., *Pall. Fl. Ross.*, i. t. 5., *Gmel. It. Ill.*, t. 4.—Branches not spiny. Fruit date-shaped, eatable; almost as large as that of a jujube, and used in the dessert in Persia, where it is called zinzeyd. The flowers are more fragrant than those of *E. h. angustifolia*. (*Lindl. in Bot. Reg.*, t. 1156., and in *Nat. Syst. Bot.*, p. 194.) There are plants of this variety in the Horticultural Society's Garden, and there is one in the Chelsea Botanic Garden.

† *E. h. 4 spinosa*; *E. spinosa* L. — Branches spiny. Leaves lanceolate. Fruit insipid.

‡ 2. *E. ARGENTEÆ Ph.* The silvery-leaved *Elæagnus*, or *Wild Olive Tree*.

Identification. Pursh Fl. Amer. Sept., 1. p. 114.; Nutt. Gen. Amer., 1. p. 97.; Lodd. Cat., ed. 1836.

Synonymic. Missouri Silver Tree, U. S. of N. Amer.

Engraving. Our fig. 1204.

Spec. Char., &c. A shrub, from 8 ft. to 12 ft. high, not spiny. Leaves waved, oval-oblong, rather acute, glabrous on both surfaces, and covered with silvery scales. Flowers aggregate, nodding. Sexes apparently diœcious. Fruit roundish-ovate, of about the size of a small cherry, cartilaginous, covered with silvery scales, having 8 grooves; the flesh dry, farinaceous, eatable; the nucule subcylindric, its exterior part consisting of a tenacious woolly integument. A native of Hudson's Bay, and found on the

1204



argillaceous broken banks of the Missouri, near Fort Mandan; flowering in July and August. (Nutt.) It was introduced in 1813. There are plants in the Horticultural Society's Garden, and in the arboretum of Messrs. Loddiges. According to Pursh, *Shepherdia argentea* Nutt. resembles the *Elæagnus argentea* Pursh so much, without the fruit, that, in this state, one might easily be mistaken for the other. In the Garden of the London Horticultural Society, the shrub or low tree bearing this name is very distinct from any species of *Elæagnus*; but it differs from the species of that genus, in having opposite leaves and branches. Whether it is the plant meant to be described by Pursh, we are unable to determine; it is certainly not the *E. argentea* figured in Watson's *Dendrologia*, which appears to be *E. orientalis*, the flowers being produced on the current year's wood. The plant which is in the Horticultural Society's Garden, and which may be considered provisionally as *E. argentea*, is one of very great neatness and beauty; and well deserving

a place in every collection, especially when trained as in our figure, so as to resemble a small tree. The plant appears nearly allied to *Shepherdia canadensis*, and we have no doubt it will ultimately be referred to that genus. Possibly, indeed, it may be only a modification of *S. canadensis*; for it is not more different from it than the woolly-leaved varieties of the common pear in a wild state, such as *Pyrus communis salicifolia*, are from the green-leaved varieties, such, for example, as those which are found indigenous in most parts of England, or are grown for stocks in British nurseries.

App. i. *Half-hardy Species of Elaëagnus.*

1205

♂ *E. conferta* Roxburgh, *Burm. Zeyl.*, t. 39. f. 1., according to Don's *Prod. Fl. Nep.*, the grouped-flowered *elaëagnus*, is a large, branched shrub, and, according to Roxburgh, a climbing one. Leaves oval-oblong, acuminate, 3—4 in. long, 1½—2 in. broad, silvery beneath. Fruit oblong, succulent, eatable. A native of Nepal, where it flowers in November, and where the fruit is eaten by the inhabitants. (*Don's Prod. Fl. Nep.*; *Lindl. Nat. Syst. of Bot.*) This species is stated to have been introduced in 1825; but we have not seen it.

♀ *E. arborea* Roxb., *Don Prod. Fl. Nep.*, p. 67., is a large tree, with spiny branchlets, and oval-oblong leaves, a native of Nepal, at Nahrinhetty, where it flowers in November, and produces an edible fruit. It was introduced in 1819.

♂ *E. latifolia* L., *Bur. Zeyl.*, 39. t. 2., is a native of the East Indies, where it forms an evergreen shrub, 4 ft. or 5 ft. high. There are plants at Messrs. Loddiges, which are preserved through the winter in cold-pits; whence we infer that, like the preceding sorts, it would stand against a conservative wall.

♂ *E. salicifolia*? D. Don, (*fig. 1205*) is a species apparently very distinct, and tolerably hardy, of which we have only seen one plant about 3 ft. high, in the arboretum at Kew. It promises to be a most valuable addition to our nearly hardy shrubs. It bears in foliage a close resemblance to *Shepherdia canadensis*.



GENUS II.



HIPPOPHAE L. THE HIPPOPHAE, SEA BUCKTHORN, or SALLOWTHORN.
Lin. Syst. Diœcia Tetrândria.

Identification. *Lin. Gen.*, 517., in part: the *H. canadensis* L. is now included in the genus *Shepherdia* Nutt.

Synonymes. *Rhamnoides Tourn. Cor.* 53.; *Argoussier, Fr.*; *Haffdorn, or Sanddorn, Ger.*; *Espino amarillo, Span.*

Derivation. *Hippophaes*, or *Hippophues*, was the name of a shrub mentioned by Theophrastus and Dioscorides; and which is supposed to be the same as the hippophyes of Pliny. The derivation is supposed to be from *hippos*, a horse, and *phaë*, to brighten; and, as according to the *Nouveau Du Hamel* the plant was employed by the Greeks as a medicine for horses, it may have been given to them to make their coats sleek and shining, and have thus procured its name.

Description, &c. Large shrubs or trees; natives of Europe and Asia; ornamental in British gardens, on account of their grey silky foliage, and of their berries.

♂ ♀ 1. *H. RHAMNÖIDES* L. The Buckthorn-like Hippophae, *Sea Buckthorn, or Sallowthorn.*

Identification. *Lin. Sp. Pl.* 1452.; *Smith Engl. Flora*, 4. p. 238.; *Eng. Bot.*, t. 425.

Synonymes. *Rhamnoides florifera salicis folio Tourn. Cor.*, 53.; *Rhamnoides fructifera Rati Syn.* 445.; *Argoussier faux Nerprun, Fr.*; *Weidenblättriger Sanddorn, Ger.*; in the Alps of Switzerland it is called *Arve*, or *Saule épineux*.

Engravings. *Eng. Bot.*, t. 425.; *Fl. Dan.*, t. 265.; *N. Du Ham.*, 6. t. 80.; *Pall. Fl. Ross.*, 1. t. 68.; and our *fig. 1206*.

Spec. Char., &c. Branches each ending in a spine. Leaves linear-lanceolate, mostly bluish, dark green, and minutely dotted, not scaly on the upper side; silvery as well as scaly on the under one. (*Smith.*) A low tree, or large shrub; a native of many parts of Europe, on sandy sea coasts. Found in England, in various places on the east and south-east coast, but not in Scotland; flowering in May, and producing bright orange-coloured berries,

which are ripe in September, and remain on the tree as long as the leaves, and frequently till the following spring.

Statistics. In the environs of London, the largest trees are those at Syon, one of which is 33 ft. high, with a trunk 11 in. in diameter, and a fine round head 17 ft. in diameter. At Kew, a male plant, near the palace, is 25 ft. high. In Oxfordshire, at Oxford, in the Botanic Garden, 10 years planted, it is 15 ft. high. In Rutlandshire, at Belvoir Castle, 18 years planted, it is 15 ft. high. In Suffolk, at Ampton Hall, 12 years planted, it is 12 ft. high. In Yorkshire, in the Hull Botanic Garden, 10 years planted, it is 12 ft. high. In Scotland, in Banffshire, at Huntley Lodge, 12 years planted, it is 20 ft. high. In Argyllshire, at Toward Castle, 13 years planted, it is 14 ft. high. In Sutherlandshire, at Dunrobin Castle, 13 years planted, it is 5 ft. high. In Ireland, in the Glasnevin Botanic Garden, Dublin, 30 years planted, it is 12 ft. high; at Cypress Grove, Dublin, it is 15 ft. high. In the King's County, at Charleville Forest, 10 years planted, it is 15 ft. high. In Galway, at Coole, it is 28 ft. high. In Louth, at Oriel Temple, 25 years planted, it is 19 ft. high. In Sligo, at Makree Castle, 10 years planted, it is 5 ft. high. In France, near Paris, at Sceaux, 10 years planted, it is 15 ft. high; in the Botanic Garden at Avranches, 10 years planted, it is 16 ft. high. In Germany, in Hanover, at Harbke, 6 years planted, it is 5 ft. high. In Saxony, at Worlitz, 46 years planted, it is 20 ft. high. In Bavaria, at Munich, in the Botanic Garden, 24 years planted, it is 18 ft. high. In Austria, near Vienna, at Brück on the Leytha, 40 years planted, it is 16 ft. high. In Prussia, near Berlin, at Sans Souci, 20 years planted, it is 16 ft. high. In Sweden, at Stockholm, in the Government Garden, 15 years planted, it is 7 ft. high. In Russia, in the Crimea, where, according to Descemet, it is employed, as in some parts of France, to fix drifting sands, and protect the seeds of *Pinus Pinaster*, which are sown on them, it grows with great vigour. In Italy, at Monza, near Milan, 21 years planted, it is 12 ft. high.

Varieties.

♣ *H. R. 2 angustifolia* Lodd. *Cat.*, ed. 1836; see the plate of this tree in our last Volume, which is a portrait of a tree, of the female sex, in Messrs. Loddiges's arboretum, taken in October, 1834. Its leaves are obviously more narrow than those of the species; the young branches are pendulous; and the tree is highly ornamental. There are plants, both of the male and of the female of this variety, in the Horticultural Society's Garden, and in the collection of Messrs. Loddiges.

♣ *H. R. 3 sibirica*, *H. sibirica* Lodd. *Cat.*, ed. 1836, appears to differ very little, if at all, from the species; but, the plant not being in a healthy state, it may be more distinct than we suppose it to be. A male plant of *H. Rhamnoides* in the London Horticultural Society's arboretum, which flowered in 1835, had its flower buds smaller and earlier in blossom than those of the other; and this, perhaps, may be *H. R. sibirica*; the plants of species which are common to Siberia, and the west of Europe, always flowering earlier in this country than plants of the same species which are indigenous to it, or to Central Europe generally.

Description, &c. In its wild state, the sea buckthorn, shallowthorn, or willowthorn, rises, with ligneous stems, to the height of 8 ft. or 10 ft.; but, in a state of culture, and when trained to a single stem, it grows twice or thrice that height. Its branches are numerous, irregular, and covered with a brown bark. The flowers are small, solitary, and appear before the leaves, or coeval with them. The berries are produced on the female plant in great abundance, when the male plant stands near it, but not otherwise. There is said to be a variety with red berries which Miller saw on the sand-banks in Holland; but we have not heard of its being in cultivation. The species is found wild in England, upon cliffs above the level of the sea, from Kent to Yorkshire; and is plentiful between Yarmouth and Cromer, on the flat sandy coast. In Russia, it is found in low, wet, and sandy situations, more particularly in the subalpine districts about Caucasus; and it is abundant throughout great part of Tartary. "*Hippophae Rhamnoides* grows in profusion all along the course of the Arve; and *Deiléphila (Sphinx) hippophaes* is now so plentiful, in consequence of the numbers of it collected and bred by the peasants, that a specimen costs



but 3 francs; specimens were formerly sold at 60 francs each, and one of those first discovered was sold for 200 francs." (*Spence in Mag. Nat. Hist.*, vol. iv., for 1830, p. 148.) A shrub so common throughout Europe and Asia could not escape being known to the Greeks and Romans; but to what use they applied it is uncertain. In modern times, its leaves form the food of sheep, in poor maritime pastures, where the sheep sometimes also eat the berries. In Dauphiny, a decoction is made of these berries, which is used for the same purpose as that made from the berries of the *Solanum Dulcamara*, in Wales; viz., to remove cutaneous eruptions. According to Pallas, the berries of the sea buckthorn are gratefully acid, and are much eaten by the Tartars, who make a jelly or preserve of them, and serve them up with milk or cheese, as great dainties. The fishermen of the Gulf of Bothnia prepare a rob, or jam, from them, which imparts a grateful flavour to fresh fish; and a kind of sauce is also made from them in the south of France. In some parts of France and Switzerland they are considered poisonous. J. J. Rousseau, in his *Réverie du Promeneur Solitaire*, vii. Promenade, relates a curious story respecting his having made a botanical excursion in the neighbourhood of Grenoble, with a local botanist, who, though he saw him eating the fruit, which he knew, or believed to be, poisonous, was so polite, or regarded Rousseau with so much respect, that he durst not presume to warn him of his danger. In Britain, and on the Continent, the sea buckthorn is sometimes planted as hedges; and, as it endures the sea breeze, and throws up suckers freely from the roots, it is a useful plant for fixing drift sands, along with the grasses *Psamma*, *Elymus*, *Carex*, &c., and also for producing woody scenery in marine situations, where few other trees or shrubs will grow. In pleasure-grounds, when trained to a single stem, it forms a small, durable, and very interesting tree, from the dull pewter-like tinge of its foliage in summer, and the fine effect of its berries in autumn; but it must be recollected that the berries will not be produced unless both sexes are planted contiguously. As the flowers, especially those of the male plants, come out very early in the season, their buds, which are in spikes, have a conspicuous appearance during winter, and contrast finely with the fruit on the female plants, which remains on through the winter, after the leaves drop off, unless it is eaten by birds. In British nurseries, plants are commonly increased by suckers, which are produced in abundance; and a deep sandy soil is suitable for growing the plant to a large size. It may be planted in elevated and exposed situations and on the sea coast, where few other trees will grow.

† 2. *H. SALICIFOLIA* D. Don.
The Willow-leaved Hippophaë,
Sea Buckthorn, or Sallowthorn.

Identification. Don Prod. Fl. Nep., p. 68.; Lodd Cat., ed. 1836.

Synonymy. *H. conferta* Wall. in MSS. of the Catalogue of the Linnean Society's Indian Herbarium, *Royle's Illust.*, p. 323.

Engraving. Our fig. 1207.

Spec. Char., &c. Without thorns, upright, branched. Leaves lanceolate, obtuse, whitely tomentose, as are the branchlets. A native of Sirinagur, in Nepal, whence it was introduced in 1822. Judging from the plants in the Horticultural Society's Garden, and in the arboretum of Messrs. Loddiges, it appears to be a much more robust species than *H. Rhamnoides*, though probably more liable to be injured by



1207

*Identifi-
Synony-
Purs.
Engraving
Spec.*

frost. The shoots produced in one season, from a plant cut down, are 5 ft. or 6 ft. in length, and the leaves about twice the length of those of the common species, much less silvery, and so closely resembling those of *Sàlix viminalis*, as to make the shoots from a plant that has been cut down liable to be mistaken for shoots of that species at a short distance. The plant in the London Horticultural Society's Garden is of the female sex, and flowered in 1835, when it was about 15 ft. high.

Statistics. In the environs of London, the largest plants are in the Horticultural Society's Garden, where they are 20 ft. high. In Surrey, at Deepdene, 9 years planted, it is 22 ft. high. In Worcestershire, at Croome, 10 years planted, it is 10 ft. high. In Scotland, in Edinburghshire, at Gosford House, 13 years planted, it is 15 ft. high. In France, in the neighbourhood of Paris, it is upwards of 30 ft. high.

GENUS III.



SHEPHERDIA Nutt. THE SHEPHERDIA. *Lin. Syst.* Dicc'ia Octándria.

Identification. Nutt. Gen. Amer., 2. p. 240.

Synonymy. *Hippóphæ L.*, as to the species *S. canadensis Nutt.*

Derivation. Named by Nuttall, in honour of the late Mr. *John Shepherd*, curator of the Botanic Garden of Liverpool, a scientific horticulturist, to whose exertions, and the patronage of the celebrated Roscoe, that institution owes its present eminence.

Description, &c. Small spinescent trees, with the aspect of *Elæagnus*. Leaves entire, covered with silvery scales. Flowers small, laterally aggregate. Berries diaphanous, scarlet, acid. (*Nutt.*) Culture, in British gardens, as in *Hippóphæ*.

♣ 1. *S. ARGENTEA Nutt.* The silvery-leaved Shepherdia.

Identification. Nutt. Gen. Amer., 2. p. 240.

Synonymy. *Hippóphæ argentea Pursh Fl. Amer. Sept.*, 1. p. 115.; Missouri Silver Leaf, and Buffalo Berry Tree, *Amer.*; Rabbit Berry, and Beef Suet Tree, *Amer. Indians*; Graise de Buffle, or Buffalo Fat, *French Traders*.

Engravings. Our fig. 1208.

Spec. Char., &c. Leaves oblong-ovate, obtuse; on both surfaces glabrous, and covered with silvery peltate scales. (*Pursh and Nutt.*) A small tree, from 12 ft. to 18 ft. high; a native of North America, on the banks of the Missouri, and its tributary streams, and of other places; flowering in April and May. It was introduced in 1818, and is not uncommon in collections. The plant in the Horticultural Society's Garden, in 1835, was 7 ft. high, though crowded among other shrubs. It forms a very elegant small tree, particularly well adapted for suburban gardens. In the Brighton Nursery, near Boston, in North America, there is a standard tree which, in 1831, was 14 ft. high, though only 8 years old, from the seed. The tree is perfectly hardy in every part of America, where it is one of the earliest-flowering trees, producing its blossoms in March.

"Its fruit is about the size of the red Antwerp currant, much richer to the taste, and forms one continued cluster on every branch and twig." (*Gard. Mag.*, vii. p. 571.) The largest plant in the neighbourhood of London is in the Twickenham Botanic Garden, where it is called *Elæagnus argentea*, and in 1836 it was 5 ft. high. It flowers freely every year. Price of plants, in the London nurseries, 2s. 6d. each.

♣ 2. *S. CANADENSIS Nutt.* The Canadian Shepherdia.

Identification. Nutt. Gen. Amer., 2. p. 241.

Synonymy. *Hippóphæ canadensis Lin. Sp. Pl.*, 1453., *Mill. Dict.*, No. 2., *Willd. Sp. Pl.*, 4. p. 744., *Pursh Fl. Amer. Sept.*, 1. p. 119.

Engravings. *Encyc. of Plants*, No. 13878.; and our fig. 1209.

Spec. Char., &c. Leaves ovate, or cordate-ovate, opposite; green, and nearly



glabrous upon the upper surface; upon the under one stellately pilose, silvery, and scaly; the scales rusty, deciduous. Branches opposite. Flowers disposed in upright racemes between the first leaves, and of half the length of these. (*Nutt., Willd., and obs.*) A deciduous shrub, a native of North America, on the borders of lakes, in the western parts of the state of New York, in Canada, and along the St. Lawrence to its source, where it grows to the height of 6 ft. or 8 ft. It has been in cultivation, in British gardens, since 1759, but is not frequent in collections. The fruit is sweetish, but scarcely eatable. A plant of this species, in the Cambridge Botanic Garden, is a thinly branched shrub, about 5 ft. high, and not striking in its general aspect; the plant in the Hackney arboretum is about the same height; one in the arboretum at Kew is only 3 ft. high. One in the Twickenham Botanic Garden is 4 ft. high.



CHAP. XCVIII.

OF THE HARDY AND HALF-HARDY LIGNEOUS PLANTS OF THE ORDER ARISTOLOCHIA'CEÆ.

THOSE of which we shall treat are included in the genus *Aristolochia* L., which has the following characters:—

ARISTOLOCHIA L. Calyx of some other colour than green, and in colour and texture resembling a corolla; in its lowest part connate with the ovary; inflated above this part, then tubular, and ending in an expanded border, which has 3 segments, and these are valvate in æstivation. Stamens 6, adhering to the style and stigmas. Style 1. Stigmas 6, radiating. Capsule with 6 cells and numerous seeds. Embryo very minute, placed in the base of fleshy albumen. Habit of growth, in most, twining. Wood without concentric zones. Leaves alternate, undivided in most. Calyx, which is the obvious part of the flower, yellow, brown, dark brown, and, in some, spotted on a yellow ground. (*Lindley, Nat. Syst. of Bot.; Willd. Sp. Pl.; and observation.*) Twining shrubs. The hardy species natives of North America, and the half-hardy of Africa and the Levant. "The most remarkable species of the genus *Aristolochia* are those which, in many of the tropical parts of America, excite the wonder of travellers, by the gigantic size or grotesque appearance of the flowers; such as *A. cymbifera*, the border of the calyx of which resembles one of the lappets of a Norman woman's cap, and measures 7 in. or 8 in. in length;" (see *Bot. Reg.*, vol. xviii. t. 1543.) and *A. cordiflora* and *A. gigantea*, the flowers of which are from 15 in. to 16 in. across, and are large enough to form bonnets for the Indian children." (*Penny Cyc.*, vol. ii. p. 328.)

GENUS II.



ARISTOLOCHIA L. THE BIRTHWORT. *Lin. Syst. Gynándria Hexándria.*

Identification. Schreb. *Lin. Gen.*, No. 1383.; *Willd. Sp. Pl.*, 4. p. 151.

Synonymes. *Aristolochie*, Fr.; *Osterluzey*, Ger.

Derivation. *Aristolochia* was the name of a plant mentioned by Dioscorides, and considered as a sovereign use in the disorders incident to childbirth: it is derived from *ariston*, best, and *lochia*, parturition.

3 1. *A. SIPHO* L'Hérit. The Siphon-like, or tube-flowered, Birthwort.

Identification. Ait. Hort. Kew., 3. p. 311.; L'Hérit. Stirp. Nov., 13. t. 7.; Michx. Fl. Bor. Amer., 2. p. 161.; Willd. Sp. Pl., 4. p. 155.; Lodd. Cat., ed. 1836.
Synonymes. *A. macrophylla* Lam. *Encycl.*, 1. p. 252.; Aristolochie Syphon, Fr.; grossblättrige Osterluzey, Ger.; Pipe Vine, or Birthwort, Amer.
Engravings. L'Hérit. Stirp. Nov., t. 7.; N. Du Ham., 4. t. 10.; Bot. Mag., t. 534.; and our fig. 1210.

Spec. Char., &c. Stem twining. Leaves cordate, acute. Bractea of the peduncle ovate. Corolla ascending; its limb in 3 equal portions, not expanding flat, brown. (Willd.) A deciduous twining shrub; a native of

North America, on the Alleghany Mountains, from Pennsylvania to Carolina; producing its yellowish brown flowers in May and June. It was introduced in 1763, and is frequent in gardens, where it forms a tall twining shrub, flowering abundantly. In favourable situations it reaches to a considerable height: a plant in the Cambridge Botanic Garden, after reaching the top of the wall it was planted against, ascended a tree in the next garden; in all 20 ft. The appearance of the magnificent leaves of this species is striking. In its native country, it climbs and twines to the summits of the very highest trees; flowering early in summer, and ripening its seeds in autumn, though but sparingly. This species is remarkable for the form of its flower, which is bent like a siphon; for the trifid border of its corolla; for the very large bractea placed on the middle of the peduncle; and for the disposition of the seeds, and the aril common to all the seeds of each cell. The roots are woody, and have the smell of camphor. The stems, branches, and twigs are also strongly scented, as are the flowers. In British gardens, this species, to grow freely, requires a deep free soil, dry rather than moist, and a warm situation. It is propagated by division of the root, by suckers, or by seeds, which are sometimes received from North America. Price of plants, in the London nurseries, 1s. 6d. each; at Bollwyller, 2 francs; and at New York, 50 cents.



3 2. *A. TOMENTO'SA* Sims. The tomentose Birthwort.

Identification. Sims in Bot. Mag., t. 1369.; Lodd. Cat., ed. 1836.
Engravings. Bot. Mag., t. 1369.; Bot. Cab., t. 641.; and our fig. 1211.

Spec. Char., &c. Stem twining. Leaves cordate, downy beneath. Peduncle solitary, without a bractea. Corolla with its tubetwisted back, and much more deeply divided than in *A. siphon*, expanding flat, and yellow, with the mouth of the tube of a deep purple. (*Encyc. of Pl.*) A native of North America; introduced in 1799. There is a plant in the Chelsea Botanic Garden, which is 12 ft. high; but we are not without considerable doubts as to its being any thing more than a variety of *A. siphon*. Being tolerably distinct, however, it merits a place in collections.



App. i. *Half-hardy Species of Aristolochia.*

A. scampervirens L., Bot. Mag., t. 1116.; Bot. Cab., t. 231., is a native of Candia; introduced in 1727, and produces its flowers in May and June. In green-houses, it is seldom seen more than 4 ft. or 5 ft. in height; but, against a conservative wall, it would probably grow much higher.

A. glauca Desf., Bot. Mag., t. 1115., Lodd. Cat., ed. 1836, is a native of Barbary; introduced in 1785. It is evergreen, like the preceding sort.

A. altissima Desf., *A. caudata* Desf., and *A. trilobata* Willd., are described in the *Nouv. Du Hamel* as growing in French gardens, with protection during winter. *A. trilobata* Bot. Reg., t. 1399., is a native of South America, where it grows to the height of 6 ft. or 7 ft. There is a species of *Aristolochia*, a native of China, against a wall in the Horticultural Society's Garden, which is not yet named. It has stood there four years, and appears quite hardy.

CHAP. XCIX.

OF THE HARDY AND HALF-HARDY LIGNEOUS PLANTS OF THE ORDER EUPHORBIA'CEÆ.

THE hardy species belonging to this order are included in 3 genera, namely *Euphórbia* L., *Stillingia* Garden, and *Búxus* Tourn.; and these have the following characters:—

EUPHÓRBLA L. What seem flowers, and were formerly deemed flowers, are now regarded as each an inflorescence. This consists of an involucre, within which flowers of both sexes are associated, many male flowers around a solitary central female one. Involucre of one leaf, bell-shaped or top-shaped, with a limb in 8—10 segments, the outer coloured and resembling petals.—Male flower. This consists of a stamen, articulated upon a supporting column that is attended, (?) at its base, by, mostly minute, chaffy scales.—Female flower. Pistil solitary, central, upon a long pedicel, and becoming protruded. Ovary roundish, of 3 cells, each containing 1 ovule, affixed to the angle next the centre of the ovary. Styles 3, connate at the base, each ending in a bifid stigma. Fruit a regma. (*Lindley's Intr. to Bot.*) Valves 3, with a partition from the centre of each, by which they form 3 cells. Seeds 1 in a cell; cells bursting elastically.—Sap, in all, milky, resinous; and, in most, acrid. Leaves, in most, alternate. Inflorescences disposed in umbels or panicles. (*T. Nees ab Esenbeck, Gen. Pl. Fl. Germ., Smith, Eng. Fl.*; and observation.)

STILLINGIA Garden. Flowers unisexual. Males in a spike; females at the base of the same spike: (?) the two kinds, in *S. ligustrina*, upon distinct plants.—Male. Seven flowers together, within an entire involucre; or, in *S. ligustrina*, with the flowers not involucreated, but solitary in the axil of a bractea. Calyx like a corolla, of 1 piece, funnel-shaped, its margin jagged; in *S. ligustrina* the calyx is 3-cleft, and rather flat. Stamens 2-3; in *S. ligustrina*, prominent, the filaments very slightly connected at the base.—Female. Involucre 1-flowered; otherwise as in the male. Calyx superior, shaped as in the male. Ovary roundish. Style thread-shaped. Stigmas 3. Fruit a regma (*Lindley's Intr. to Bot.*), surrounded at the base by the involucre a little enlarged, somewhat turbinate, bluntly triangular, 3-lobed, 3-celled, 1-seed in each cell.—Sap milky. Leaves alternate, stipuled, entire. Spikes of flowers solitary or dichotomous, terminal or lateral. (*Smith in Rees's Cyclop.*; and *Nutt.* in his *Gen. Amer.*)

BÚXUS Tourn. Flowers in axillary groups; unisexual in effect, but the male flowers have a rudiment of a pistil; those of both sexes borne on one plant.—Male. Calyx of 4 minute leaves. Stamens 4, inserted under the rudiment of a pistil.—Female. Flowers singly, at the tip of groups of male ones. Calyx as in the male. Ovary sessile, roundish, of 3 cells, and 3 ovules in each cell. Styles 3. Stigmas 3. Fruit a regma, leathery, beaked with the styles; consisting of 3 incomplete cells that open down the centre and divide the style, and of 3 valves that bear the incomplete dissepiments in their centres. Seeds 2 in a cell, pendulous, both enclosed in the endocarpial lining of the cell; and this endocarpial lining, after the seed is ripe, disperses elastically, to admit of, and conduce to, their dispersion. (*T. Nees ab Esenbeck's Gen. Pl. Fl. Ger.*)—Evergreen shrubs, or small trees, with rigid

smooth, stalked, opposite, entire leaves. Flowers aggregate, from axillary buds, whitish. Fruit green. (Smith Eng. Fl., iv. p. 132.)

GENUS I.



EUPHORBIA L. THE EUPHORBIA, or SPURGE. Lin. Syst. Monœ'cia Monándria.

Identification. Lin. Gen., 243.; Lam. Ill., t. 411.; Smith Eng. Fl., 4. p. 58. Synonymes. Tithymalus Tourn. Inst., t. 18., Gærtn. Fruct., t. 107.; Euphorbe, Fr.; Wolfsmilch, Ger. Derivation. From Euphorbus, physician to Juba, king of Mauritania, who is said first to have used some of the plants of this genus in medicine.

Description, &c. This genus consists of milky plants, most of which are herbaceous, but two or three of which are rather woody. The flowers of the hardy kinds are generally of a greenish colour, which renders them inconspicuous; and they have all an extremely acrid juice, which has the appearance of milk. This juice was formerly considered medicinal, and is still used occasionally to destroy warts, or for raising slight blisters. The plants are propagated by division. The only two worth cultivating, as shrubby, appear to us to be the E. Charàcias L. and E. spinosa L.

E. Charàcias L., Mart. Mill., No. 95., Smith Eng. Fl., iv. p. 68., Eng. Bot., t. 442.; E. aléppica of some gardens; and our fig. 1212. — An upright, bushy, leafy plant, green in its foliage, and purplish brown in the bark of its shoots, which are mostly unbranched. The flowers are in stalked panicles a few in each panicle, and the panicles are disposed racemously along the upper portions of the shoots. The more obviously coloured part of the inflorescence is of a dark purple. The scent of the flowers is powerfully fetid and disagreeable. The plant, in a sheltered nook, under a wall, will attain to the height of 3 ft. or more (in Martyn's Miller, 5 ft. or 6 ft.); and is interesting, even when not in flower, from its being evergreen, and from the character of its foliage; the leaves being lanceolate, acute, entire, downy, dark green, and spreading every way. (Smith Eng. Fl., and observation.) It is indigenous in France, Spain, and Italy, according to Willd. Sp. Pl.; and, according to Mr. Whately, as quoted in Eng. Fl., it is very plentiful in the Forest of Needwood, Staffordshire, and undoubtedly wild there. A plant which we have had in our garden, at Bayswater, since 1828, was found wild by us, in the July of that year, in a wood belonging to John Perry, Esq., at Stroud House, near Hazlemere. It forms a dense evergreen bush, admirably adapted for rockwork; its fine, dark, bluish-green, shining leaves, with which the shoots are densely clothed, render it highly ornamental at every season of the year; and its flowers, which appear in February, continue on the plant through the spring and part of the following summer.

E. spinosa L., Wats. Dend. Brit., t. 45, and our fig. 1209. — A leafy, shrubby plant; a native of the south of Europe; generally kept in green-houses in Britain, where it assumes the character of an erect shrub, about 2 ft. high, with a decidedly ligneous stem. The tips of the branches become dry with age, and as, though withered, they continue on the plant, they have the appearance of spines. It was cultivated by Miller, in 1752, but is rare in British collections. In the open air, in the Botanic Garden at Cambridge, it is a recumbent shrub. It is not easily propagated by cuttings made in the common way, but is said to grow readily from cuttings of the roots.



1212



1213

App. i. *Half-hardy Species of Euphórbia.*

E. dendröides L. is a native of Italy, Crete, and of the Island of Hieres, near Toulon, where it forms a small branched shrub, about 4 ft. high. *E. Characiás* and *E. dendröides*, according to Dr. Philippi, grow in the streams of decayed lava on Etna. *E. dendröides*, he adds, "is one of the finest shrubs in Sicily, and rises to a height of about 6 ft., the stem forking soon above the ground, and each branch divided again, so that the form of the whole is perfectly semiglobular. In summer it is quite bare of foliage, when the numerous, smooth, verticillate branches give the plant a most singular appearance; but with the rains of autumn the numerous linear leaves begin to sprout forth at the end of the boughs, and a corymb of yellow flowers tips the extremity of each in February." (*Comp. to the Bot. Mag.*, t. 1. 51.)

E. mellifera Ait., Bot. Mag., t. 1305., and our fig. 1214, is a handsome free-growing shrub, a native of Madeira. A plant stood out in the Trinity College Botanic Garden, at Dublin, from 1821 to 1831, forming a bush about 4½ ft. high, and 5 ft. in diameter, flowering all the winter. It was cut down by the severe frost of the spring of 1831, but sprang up again; and it is now (Sept. 1836), Mr. Mackay informs us, nearly 5 ft. in height, and 5 ft. in diameter. *E. Characiás*, in the same garden, rarely exceeds 2½ ft. in height.

Other species, natives of the Levant, the Canaries, Portugal, and North and South America, may possibly be found as hardy as *E. mellifera*. In the *Vues Phytostatiques* of Webb and Bertholet's *Histoire Naturelle des Isles Canaries*, the *E. canariénsis* and *E. piscatöria* are represented in pl. 2. as the prevailing species; the latter forming handsome trees, from 10 ft. to 15 ft. high, with straight, erect stems.



1214

GENUS II.

STILLINGIA Garden. THE STILLINGIA. *Lin. Syst. Monac'cia*
Monadélphia.

Identification. "Stillingia was sent under that name to Linnæus by the celebrated Dr. Alexander Garden." (*Smith in Rees's Cyclop.*) *Lin. Mant.*, 19.; *Schreb. Lin. Gen.*, 638.; *Smith in Rees's Cyclop.*; *Mart. Mill. Dict.*

Derivation. Named by Dr. Alexander Garden in honour of Mr. Benjamin Stillingfleet, author of a work entitled *Miscellaneous Tracts relating to Natural History, &c.*, partly translated from the writings of Linnæus.

Description, &c. The only hardy species is a deciduous shrub; a native of North America.

♣ I. S. LIGUSTRINA Willd. The Privet-leaved Stillingia.

Identification. Willd. *Sp. Pl.*, 4. p. 588.; Pursh *Fl. Amer. Sept.*, 2. p. 608.

Spec. Char., &c. Shrubby. Leaf consisting of a petiole and a disk that is oval-lanceolate, pointed at both ends, and entire. Male flowers upon very short pedicels. (*Michx. Fl. Bor. Amer.*, ii. p. 213.) Nuttall has questioned whether the sexes are not diœcious, and has noted the female flowers as "not seen," but the male ones as being disposed in spikes, part lateral, part terminal, and as having a 3-cleft, rather flat, calyx, and 3 stamens that have kidney-shaped anthers; and the bractœas as 1-2-glanded and 1-flowered. (*Nutt. Gen. Amer.*) A deciduous shrub, growing about 4 ft. high; a native of North America, in shady woods, in Carolina and Georgia; flowering in June and July. It was introduced in 1812, and plants were in the collection of Messrs. Loddiges in 1830. From these gentlemen we received a plant in that year, but it is since dead; as is also a plant of this species in the Hackney arboretum; we are not aware that the species is now in existence, in a living state, in England.

GENUS III.

BUXUS Tourn. THE BOX TREE. *Lin. Syst. Monac'cia Tetrándria.*

Identification. Tourn. *Inst.*, t. 345.; *Lin. Gen.*, 486.; *Smith Eng. Flora*, 4. p. 132.; *Theodor Nees ab Esenbeck Gen. Plant. Floræ Germanicæ*, fasc. 3. t. 16.

Synonymes. Buis, *Fr.*; Buxbaum, Buchsbaum, *Ger.*

Derivation. From *puknos*, dense; in reference to the hardness and closeness of the wood; or, perhaps, to the denseness of the foliage. The Greeks called the boxes made of this wood, which were highly esteemed for their durability, *pyrides*; and hence, probably, arose the word *pyx*, which is used for the chest containing the Host in the Roman Catholic church.

Description, &c. Low evergreen trees or shrubs, with shining coriaceous leaves, and greenish yellow flowers; natives of Europe, and the temperate parts of Asia; of easy culture in any soil that is tolerably dry; and propagated freely by cuttings, or by seeds.

† * 1. *B. SEMPERVIRENS* L. The evergreen, or common, Box Tree.

Identification. Lin. Sp. Pl., 1394; Smith Eng. Flora, 4. p. 133; Baxt. Brit. Flow. Pl., 2. t. 142. *Synonymes.* *Buxus Raïi* Syn., 445., *Ger. Emac.*, 1410. f., and other authors; *Buis* commun, Bois bœni, Fr.; *Buchsbaum*, Ger.; *Busso*, *Bossolo*, *Mortel*, *Ital.*
Engraving. Eng. Bot., t. 1341.

Spec. Char., &c. Disk of leaf ovate, convex; footstalk slightly downy at the edges. Anthers ovate-arrow-shaped. (*Smith's Eng. Fl.*, iv. p. 133.) A low evergreen tree, a native of many parts of Europe, and, according to some, including Britain; growing to the height of from 15 ft. to 30 ft.; and flowering in April and May.

Varieties and Subvarieties.

† *B. s.* 1 *arborescens* Mill. Dict., No. 1; *Buis* arborescent, Fr.; hochstaniing Buchsbaum, Ger. — Arborescent. Leaves ovate. (*Willd. Sp. Pl.*) This is the most common form of the species.

† *B. s. a. argentea* Hort. — Arborescent. Leaves ovate, variegated with a silvery colour.

† *B. s. a. aurea* Hort. — Arborescent. Leaves ovate, variegated with a golden colour.

† *B. s. a. marginata* Hort. — Arborescent. Leaf ovate, with a margin of a golden colour.

† *B. s.* 2 *angustifolia* Mill. Dict., No. 2. — Arborescent. Leaves lanceolate. (*Willd. Sp. Pl.*)

† *B. s. a. variegata* Hort. — Arborescent. Leaves lanceolate, variegated.

† *B. s.* 3 *suffruticosa* Mill. Dict., No. 3; *B. humilis* *Dod. Pempt.*, 782; *B. s. nana* *N. Du Ham.*, i. p. 83; and our fig. 1215; *Buis* nain, *Buis à Bordures*, *Buis d'Artois*, *Buis de Hollande*, *petit Buis*, Fr.; *zwerch Buchsbaum*, Ger. — Dwarf. Leaves small, obovate. (*Lam. Encyc. Willd. Sp. Pl.*) This is the kind usually cultivated for edging beds in gardens.

* *B. s.* 4 *myrtifolia* *Lam. Encyc.* — Dwarf. Leaves small, oblong, narrowish. (*Lam. Encyc.*, i. p. 505; *Willd. Sp. Pl.*) A pretty little plant; generally quite low, but, under favourable circumstances, growing to a considerable size.



1215

Description, &c. The box is a well-known hardy evergreen tree or shrub, much esteemed in Europe, both for ornamental and useful purposes. In a wild state, it seldom exceeds the height of 12 ft. or 15 ft. in Britain; but, in Turkey and Asia Minor, trees of it have been found as high as 25 ft. The thickness of the trunk is very considerable in proportion to its height, and, in full-grown trees, varies from 6 in. to 8 in. in diameter. The bark is yellowish on the young wood, but rough and greyish on the trunk of old trees. The leaves are opposite, oval, and almost sessile: they are persistent, of a coriaceous texture, and a shining yellowish green, when they grow in a situation fully exposed to the light; but of a fine deep glossy green when shaded by other trees. The flowers are of a greenish yellow, and are disposed in little tufts in the axils of the leaves. The tree will bear the knife patiently, and is therefore, and from the closeness of its habit of growth, well adapted for clipped hedges, and all kinds of verdant architecture and statuary. "The box," says

a French writer, "has the advantage of taking any form that may be wished, under the hands of the gardener. Here it displays a niche cut in an apparently solid green bank; there, an arbour impenetrable to the rays of the sun. On one side it covers a wall with a tapestry of continual verdure, and on the other it clothes a palisade: now it divides the walks of a garden, and now it marks out the figure of a parterre. In all cases, it presents a most agreeable verdure to the eyes, and preserves the idea of cheerfulness even in winter, when almost every other tree appears mourning for the absence of the sun." (*Nouv. Cours. d'Agri.*, tom. iii. p. 276.) It grows slowly, rarely making shoots of more than 6 in. or 8 in. annually. But the tree is of great longevity; and so extremely hardy, that it is the only evergreen that will stand in the open air, without protection, in the gardens of Paris, Berlin, and Vienna.

Geography. The box is found wild throughout Europe and Asia, between 37° and 52° of N. lat., on mountains, and spreading as undergrowth among other trees, but never forming forests entirely by itself. The largest collections of wild box trees in Europe are in the Forest of Ligny in France, and in that of St. Claude on Mount Jura; but in both cases the box trees are mixed with trees of other species. Box trees are also found in forests of other trees, in several parts of France; particularly in Franche Comté, Dauphiné, Haute Provence, the chain of mountains stretching across Languedoc, and the Pyrenees. The box tree is produced abundantly in Turkey, and on the shores of the Black Sea; but a great proportion of the boxwood of commerce, sold in the European markets as Turkey box, is grown in Circassia and Georgia, whence it is brought to Odessa, and shipped for Europe. It is found in various parts of Persia, China, Cochinchina, and, according to some, in Japan. In Britain, the box is a disputed native. (See p. 25.) It grows plentifully upon Box Hill, near Dorking, in Surrey: not among deciduous trees, and shaded by them, as it does in its native habitats in France, and in other parts of the Continent; but only mixed with a few juniper bushes, that do not rise so high as itself. Ray mentions three other habitats; viz. Boxwell, in Gloucestershire; Boxley, in Kent; and the chalk hills near Dunstable: but the box tree does not appear to be now found growing in uncultivated ground any where in Britain, but on Box Hill. In Baxter's *British Flowering Plants*, vol. ii. p. 145., it is stated, on the authority of the Rev. Archdeacon Pierson, to be found in the hedges about Kilburne, near Coxwold, in Yorkshire; which, however, is no proof of its being indigenous.

History. The box tree appears to have been first mentioned by Theophrastus, who ranks the wood with that of ebony, on account of the closeness of its grain. Pliny describes it as being as hard to burn as iron, as producing no flame, and as being totally unfit for charcoal. He distinguishes three kinds, which he calls the larger, the smaller, and the Italian box; and speaks of the use of the tree for topiary work, and of the wood for musical instruments. Vitruvius also recommends the box for topiary work; and it appears to have been much employed in verdant sculpture, and close-clipped hedges, in the gardens of Roman villas in the Augustan age. Pliny describes his Tusculan villa as having a lawn adorned with figures of animals cut out in box trees, answering alternately to one another. This lawn was again surrounded by a walk enclosed with evergreen shrubs, sheared into a variety of forms. Beyond this was a place of exercise, of a circular form, ornamented in the middle with box trees, sheared, as before, into numerous different figures; and the whole fenced in by a sloping bank, covered with box, rising in steps to the top. In another part of the grounds of the same villa, the box is mentioned as being cut into a variety of shapes and letters; some expressing the name of the master, and others that of the artificer, &c. (*Plin. Epist.*, book v. letter vi.) The same practice is followed in several Roman gardens at the present day; and, in that of the Vatican, the name of the pope, the date of his election, &c., may be read from the windows of the palace in letters of box. Virgil calls it

"Smooth-grain'd, and proper for the turner's trade,
Which curious hands may carve, and steel with ease invade."

DRYDEN'S *Virgil*.

Both Virgil and Ovid allude to the use of this wood for musical instruments, and employ the word box as if synonymous with that of flute. In more modern times, in Britain, it is mentioned by Turner, Gerard, Parkinson, and other writers on gardening and rural affairs; and, previously to the eighteenth century, was in great repute for gardens in the geometric style, from the facility with which it could be made to assume whatever form the gardener wished: it was also highly valuable when there were but few evergreens grown in England, from its hardy habit, and the liveliness of its hue. The wood of the tree has been in use for turnery from the earliest ages, and for wood engraving since the fifteenth century.

Properties and Uses. The wood of the box is remarkably heavy; weighing, when newly cut, 80 lb. 7 oz. per cubic foot, and, when perfectly dry, 68 lb. 12 oz. and 7 gr. It is the only European wood that will sink in water: it is yellow, very hard, and susceptible of a fine polish. The wood was formerly much used in England in cabinet-making and inlaying, as it still is in France; and, also, in both countries, for musical and mathematical instruments, combs, and various articles of turnery. The principal use of the boxwood, however, at present, is for wood engraving; and for this purpose it is an important article of commerce.

For Turnery, the boxwood used by the cabinet-makers and turners in France is chiefly that of the root. The town of St. Claude, near which is one of the largest natural box woods in Europe, is almost entirely inhabited by turners, who make snuff-boxes, rosary beads, forks, spoons, buttons, and numerous other articles. The wood of some roots is more beautifully marbled, or veined, than that of others; and the articles manufactured vary in price accordingly. The wood of the trunk is rarely found of sufficient size for blocks in France; and when it is, it is so dear, that the entire trunk of a tree is seldom sold at once, but a few feet are disposed of at a time, which are cut off the living tree as they are wanted. There are in the Forest of Ligny, generally, many stumps which have been treated in this manner. Boxes, &c., formed of the trunk, are easily distinguished from those made of the root, by the wood of the trunk always displaying a beautiful and very regular star, which is never the case with that of the root. Boxwood is very apt to split in drying; and, to prevent this, the French turners put the wood designed for their finest works into a dark cellar as soon as it is cut, where they keep it from three to five years, according to circumstances. At the expiration of the given time, they strike off the sap-wood with a hatchet, and place the heart-wood again in the cellar till it is wanted for the lathe. For the most delicate articles, the wood is soaked for 24 hours in fresh very clear water, and then boiled for some time. When taken out of the boiling water, it is wiped perfectly dry, and buried, till wanted for use, in sand or bran, so as to be completely excluded from the light, and air. Articles made of wood thus prepared, resemble, in appearance, what is called Tunbridge ware. The spray of the box, though it burns very slowly, is much esteemed in France, as fuel for lime-kilns, brick-kilns, ovens, &c., where a great and lasting heat is required. (*Now. Cours., &c.*)

Wood Engraving. The wood used for this purpose is chiefly imported from Turkey or Odessa; and sells, in London, for from 7*l.* to 14*l.* a ton, duty included; the average annual consumption in Britain being about 582 tons. In the year 1832, McCulloch tells us (in his *Dictionary of Commerce*), the duty on imported boxwood was 1867*l.* 17*s.* 4*d.* In France, the native trees are seldom of sufficient size for wood engraving; and wood to the amount of 10,000 francs is annually imported from Spain. The box trees which were cut down on Box Hill in 1815 produced upwards of 10,000*l.* The art of cutting on wood was invented before the art of printing; and it is supposed to have been first practised between the years 1400 and 1430. The first objects to which it was applied were very different in their character; viz. books of devotion and playing cards. The mere outlines of the figures were rudely cut in the wood with knives in the direction of the grain, and the

impressions were taken off by friction, without the aid of a press. The earliest specimen of wood engraving now extant in England is in the collection of Earl Spencer, and represents St. Christopher carrying the infant Saviour: the date is 1423. A very curious work was published between 1430 and 1450, entitled *Biblia Pauperum*, the Bible of the Poor. This work consisted of about 40 plates, illustrated by texts of scripture, all cut in wood (see *Penny Magazine*, vol. ii. p. 419.); and it is supposed to have given the first idea of the art of printing with movable types, which was invented soon after by Guttenberg. Wohlgenuth, a wood-engraver at Nuremberg in 1480, was the first who attempted to introduce shade into wood engravings; and his pupil, Albert Durer, carried the art to a very high degree of perfection; in his time the wood-cutters, or formschneiders, of Germany became so numerous as to be incorporated into a body distinct from that of the briefnablers, letter-painters or writers. Holbein succeeded Albert Durer; but soon afterwards the art of engraving on copper having been discovered, wood engraving was comparatively neglected; and it fell into disuse till the time of Bewick, who displayed in it such extraordinary force, and delicacy of execution, as to revive a taste for the art. The first engravers on wood, and up to the time of Bewick, or nearly so, were accustomed to have the trunks of the trees on which they were to engrave sawn up into planks, and to cut out the engraving with a knife, or other tools, on the side of the grain; but, about Bewick's time, or before, the practice of cutting the trunk across into sections about 1 in. in thickness was adopted; and the engravings were cut on the wood, across the grain, with tools which will be hereafter described. The advantages of this mode are, that much finer lines can be produced; that the engraved block will give a much greater number of impressions; and that it will be far more durable. The followers of Bewick produced some beautiful engravings; but, from the mode of printing them, though they were mixed with the type, they were almost as expensive as if they had been worked, like the metal engravings, from separate plates. By the modern practice, however, woodcuts are printed from with the same ease as the movable types. The mode in which the operation of cutting on wood is still performed differs but little, according to the *Penny Magazine*, from that described and illustrated by a plate in a work called the *Book of Trades*, published at Frankfort in 1654. In this plate, the formschneider, or wood-cutter, is represented sitting "at a table, holding the block in his left hand, upon which he is cutting with a small graver in his right. Another graver, and a sort of a gouge, or chisel, lie upon the table. If we enter the work-room of a wood-engraver of the present day, we shall find the instruments by which he is surrounded nearly as few and as simple. His block rests upon a flat circular leather cushion filled with sand: and this so completely answers the purpose of holding the block firmly, and yet allowing it to be moved in every direction, that it is expressively called the wood-cutter's third hand. His cutting instruments are of three sorts: the first, which is called a graver, is a tool with a lozenge-shaped point, used for outlines and fine tints; the second, called a scauper, presents a triangular point and edges, and is used for deeper and bolder work; and the third, which is a flat tool, or chisel, is employed in cutting away those parts of the block that are to be left entirely light." (*Penny Magazine*.) The design is previously drawn upon the block with a black-lead pencil; the block, which is always cut directly across the grain, and polished so as to present a perfectly smooth surface, being previously prepared with powdered white lead mixed with a little water, to make it receive the pencil. The drawing is generally made by one artist, and the engraving executed by another. It is the business of the wood-cutter "to leave all the lines which the draughtsman has traced with his pencil; and to do this, he, of course, cuts away all the parts which form the spaces between the various lines of the drawing. The lines thus stand up, as it is called, in relief; and, when ink is applied to them by the printer, in the same way as he applies it to his metal types, they transfer the ink to the paper placed over them upon being subjected

to an adequate pressure." (*Ibid.*) Formerly, a great deal of care was required, in printing woodcuts, in "the adjustment of a number of small pieces of paper between the stretched parchment and blanket that covered the block, during the impression from the common hand-press, in order to give a greater force to the bearing upon shadows, while the lights were, of course, equally relieved from the pressure;" but a mode is now discovered of lowering the lights by the wood-engraver; and the blocks are now introduced with the type, and printed from with the same facility, by the revolving cylinder of a printing-machine.

In the *geometrical and architectural Style of Gardening*, the box was extensively employed, both as a tree and as a shrub, throughout Europe, from the earliest times. As a tree, it formed, when clipped into shape, hedges, arcades, arbours, and, above all, figures of men and animals. As a shrub, it was used to border beds and walks, and to execute numerous curious devices; such as letters, coats of arms, &c., on the ground; but of all the uses of the dwarf box, the most important, in the ancient style of gardening, was that of forming parterres of embroidery; it being the only evergreen shrub susceptible of forming the delicate lines which that style of parterre required, and of being kept within the narrow limits of these lines for a number of years. In those days, when the flowers used in ornamenting gardens were few, the great art of the gardener was to distinguish his parterres by beautiful and curious artificial forms of evergreen plants. These forms may be described generally as belonging to that style of ornament known as the taste of Louis Quatorze. *Fig.* 1216. is a small



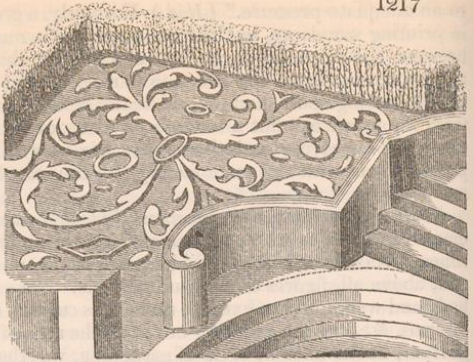
1216

portion of the ground plan of a parterre laid out in this manner; all the lines and dark parts of the figure being formed of box, in no part allowed to grow higher than 3 in. from the ground, and the finer lines being about 2 in. wide. The space between the lines, in the more common designs, was covered with sand all of one colour; but in the more choice parterres, different coloured sands, earths, shells, powdered glass or potsherd, and other articles, were used, so as to produce red, white, and black grounds, on which the green of the box appeared to advantage at all seasons. This variety of colours gave occasion to Lord Bacon's remark: "As for the making of knots and figures with divers coloured earths, they be but toys: you may see as good sights many times in tarts." The beauty of these parterres was most conspicuous, when they were seen as a whole from the windows of the house, or from a surrounding terrace-walk. Sometimes, however, they were placed on a sloping bank, to be seen from below; an instance of which may be found in the view of the Palazzo del N. H. Venier, on the Brenta, as given in Volkamer's *Continuation der Nürembergischen Hesperidum*, published in 1714, a portion of which is represented in perspective in *fig.* 1217. In a view of

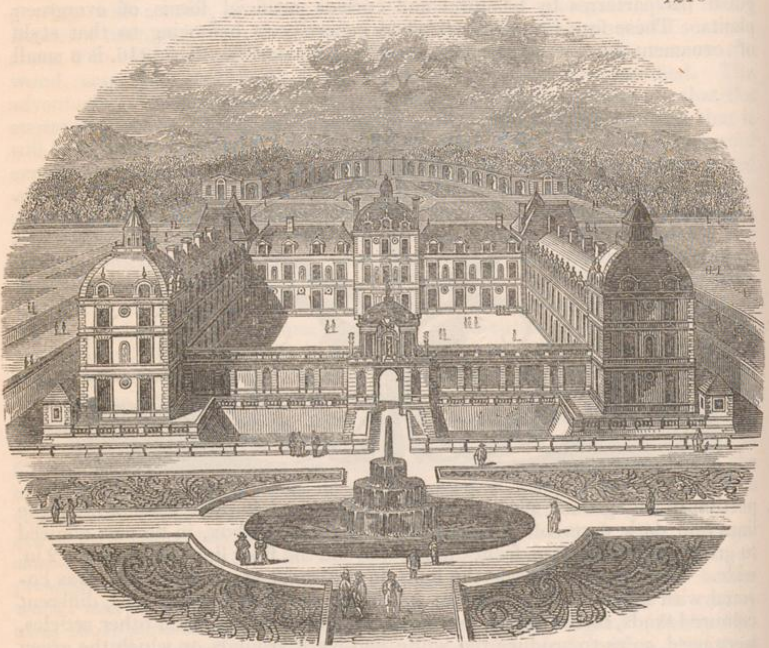
“le Chateau de Richelieu en Poitou,” given in Marrot’s *Recueil des Plans, &c., des plusieurs de Chateaux, Grottes, &c.*, published in 1661, of which our *fig. 1218*. is a copy, a very rich parterre of embroidery may be observed in the fore-ground with a fountain in the centre; and, in the back-ground, a large semi circular space appears to be covered with the same description of ornament. It may also be observed, that there is not a single tree or shrub shown in

a natural state within several hundred feet of the house, on every side. The embroidered style of parterre is still occasionally to be met with adjoining

1217



1218



ing very old residences in France and Italy, and even in a few places in England; and, as affording variety, it is at least as worthy of revival as the architectural style of the age in which it most extensively prevailed. The best designs in this style are to be found in the edition of Boyceau’s *Jardinage, &c.*, which was published in 1714, in folio. Topiary work, or the art of cutting the box and other trees into artificial forms, was carried to such an extent among the Romans, that both Pliny and Vitruvius use the word *topiarius* to express the art of the gardener; a proof that, as far as ornament was concerned, the art of clipping was considered the highest accomplishment that could be possessed by a gardener, among the ancient Romans. This

appears to have been equally the case in Europe in modern times; gardeners, even so late as the time of the Commonwealth, being called by Commenius pleachers (See *Janua Trilinguis*, Oxford edit.) About the middle of the seventeenth century, the taste for verdant sculpture was at its height in England; and, about the beginning of the eighteenth, it afforded a subject of railery for the wits of the day, soon afterwards beginning to decline. There are some humorous papers on the subject in the *Guardian*, and other contemporary works. The following lines will give a good idea of a topiary garden:—

“ There likewise mote be seen on every side
The shapely box, of all its branching pride
Ungently shorne, and, with preposterous skill,
To various beasts, and birds of sundry quill,
Transform'd, and human shapes of monstrous size.

Also other wonders of the sportive shears,
Fair Nature mis-adorning, there were found:
Globes, spiral columns, pyramids, and piers
With spouting urns and budding statues crown'd;
And horizontal dials on the ground,
In living box, by cunning artists traced;
And galleys trim, on no long voyage bound,
But by their roots there ever anchor'd fast.”

G. WEST.

In *modern Gardening*, the tree box forms one of our most valuable evergreen shrubs or low trees. It is more particularly eligible as an undergrowth in ornamental plantations; where, partially shaded by other trees, its leaves take a deeper green, and shine more conspicuously. Next to the holly, it has the most beautiful appearance in winter; more especially when the ground is covered with snow. The variegated sorts are admissible as objects of curiosity; but, as they are apt to lose their variegation when planted in the shade, and as, in the full light, their green is frequently of a sickly yellowish hue, we do not think that they can be recommended as ornamental. The myrtle-leaved forms a very handsome small bush on a lawn. The use of the dwarf box for edgings is familiar to every one.

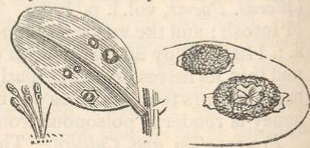
The *other Uses* of the box, in former times, were various; but most of them are now almost forgotten. The bark and leaves are bitter, and have a disagreeable smell; and a decoction of them, when taken in a large dose, is said to be purgative; and, in a small dose, sudorific. An empyreumatic oil is extracted from them, which is said to cure the toothach and some other disorders. A tincture was made from them, which was once a celebrated specific in Germany for intermittent fevers; but, the secret having been purchased and made public by Joseph I., the medicine fell into disuse. Olivier de Serres (*Théât. d'Agri.*) recommends the branches and leaves of the box, as by far the best manure for the grape; not only because it is very common in the south of France, but because there is no plant that by its decomposition affords a greater quantity of vegetable mould. The box is said to enter into the composition of various medicated oils for strengthening and increasing the growth of the hair; and Parkinson says that “the leaves and sawdust, boiled in lie, will change the hair to an auburn colour.” Box is sometimes substituted for holly in the churches at Christmas; and, in a note to Wordsworth's poems, we are informed that, “in several parts of the north of England, when a funeral takes place, a basinful of sprigs of box is placed at the door of the house from which the coffin is taken up; and each person who attends the funeral takes one of these sprigs, and throws it into the grave of the deceased.” (*Words. Poems*, vol. i. p. 163.) The box is the badge of the Highland clan M'Intosh; and the variegated kind, of the clan M'Pherson. (*Bart. Brit. Fl. Pl.*, ii. t. 142.) Pliny affirms that no animal will eat the seed of the box; and it is said that its leaves are particularly poisonous to camels. It is also asserted by many authors that box trees are never cropped by cattle; and that the Corsican honey is rendered poisonous from the bees feeding on the flowers of the box.

Propagation and Culture. The box is propagated by seeds, cuttings, and layers. It seeds freely where it is allowed to grow freely; but, where it is

closely clipped in, the seeds are seldom permitted to ripen. When the seeds are to be sown, they should be gathered the moment the capsules appear ready to open, and sown immediately in light rich earth, consisting chiefly of vegetable mould, which is well drained, so that the water may never lie on the seeds.

Cuttings of from 4 in. to 6 in. in length should be put in, in autumn, in a sandy soil, and a shaded situation, and in a year they will be fit to transplant into nursery lines. Layers may be made either in the spring or autumn, and either of the young or old wood. The dwarf box used for edgings is propagated by being taken up, divided, and replanted. The roots of the box, being numerous and small, though by no means hair-like, like those of the *Ericaceæ*, retain the earth about them; so that plants of box always come up with a ball; and hence the tree may be transplanted at almost any season, provided, if in summer, that the weather be moist at the time. Box edgings are best planted early in spring, because the frost in winter is apt to destroy those leaves which have been cut in trimming the plants. Box edgings and hedges may be clipped at almost any season, except midwinter. Some gardeners prefer trimming box edgings in June, just when the plants have nearly completed their year's shoots; because they will afterwards make shoots of $\frac{3}{4}$ in. or 1 in. in length, or, at all events, protrude a few leaves, and thus, in a week or two, will conceal all appearance of the use of the shears. When this practice is followed, it is necessary to go over the edgings or hedges in July, in order to cut neatly off with the knife any shoots that may have been protruded too far; taking care not to cut the leaves. The more common practice is to clip the box in autumn; but in that case, as many of the leaves are injured by the shears, their marks remain till the middle of the following May. The edging or hedge looks well for a fortnight at that season; but afterwards it has rather a neglected appearance, till the next trimming season, which is in the beginning of September. The superiority of the June clipping must be obvious, whether applied to edgings, hedges, or mural or sculpturesque ornaments. Box edgings, when kept low, if they are wanted to endure many years, require occasionally to be cut in almost to the ground; and this operation should only be performed on one side of the edging in one year, and not on the other side till the second year following. When treated in this way, both edgings and hedges will, on good loamy soil, last an extraordinary length of time; whereas, if they are continually clipped on the surface only, a network of shoots is formed there, which, by excluding the air from the stem within, occasions the decay of the weakest; and the edging or hedge becomes naked below, and unsightly. Sometimes this evil may be remedied by cutting down; but, in general, the best mode is to replant. The form of the section of a box edging or hedge should always be that of a truncated triangle; the broadest end being that next to the ground. In the case of edgings to walks, or to flowerbeds, their breadth at the ground may be 3 in., the height 4 in., and the breadth at top 2 in.; or half these dimensions may be adopted. In every case, both of edgings and hedges, the base ought always to be broader than the summit, in order that the rain may fall on the sides, and the light of the sun strike on them with more force. In clipping box trees into artificial forms, it is usual to enclose the tree in a slight frame of wirework of the form proposed: the wire should be copper, and painted green, for the sake of durability, and to render it inconspicuous. The same kind of skeleton wirework, or trellis-work, is put up for mural and architectural topiary work.

Insects and Diseases. The box is very rarely attacked by insects, and has very few diseases. There is a proliferous growth of leaves at the points of the shoots, which appears in some seasons, and is probably occasioned by the puncture of an insect, but of what species we are not aware. The fungus *Puccinia Buxi* *Grevel.* (*fig. 1219.*) is found occasionally on the leaves.



1219

Statistics. The largest box trees in the neighbourhood of London are at Syon, where there are various trees from 13 ft. to 16 ft. in height. There is also one at Kew, 15 ft. high. In the Oxford Botanic Garden, there are two old box trees, one of which, in 1835, was 21 ft. high, the diameter of the trunk 7½ in., and of the head 18 ft. The largest box hedge in England is at Petworth, where it is more than 12 ft. broad at the bottom, 15 ft. high, and 40 yards long: it is supposed to be upwards of two centuries old. The oldest sculpturesque topiary works in England are in the garden at Leven's Grove, in Westmoreland, laid out in the time of James II. In Scotland, at West Plean, near Stirling, there is a box tree, 10 years planted, that is 6 ft. high. In France, in the Jardin des Plantes, a box tree, upwards of 100 years planted, has attained the height of 30 ft.

Commercial Statistics. Plants of the tree box, in the London nurseries, are from 6d. to 1s. 6d. each, according to the size of the variety: at Bollwyller plants of the species are 50 cents each; and of the varieties, from 1 franc to 1½ francs each: at New York, plants, or the tree kind are 25 cents each; and of its varieties, 37½ cents. The dwarf box is sold, in English nurseries, at 6d. per yard; at New York, at 50 cents per yard.

‡ 2. *B. BALEÁRICA* Willd. The Balearic Box.

Identification. Willd. Arb., 50, Sp. Pl. 4, p. 337.; ?Lam. Encyc., 1. p. 505.
Synonymes. *B. s.* var. *gigantæa* N. Du Ham., 1. p. 82.; Minorca Box;
 Buis de Minorque, Buis de Mahon, Fr.; Balearischer Buchsbaum, Ger.
Engravings. N. Du Ham., pl. 23. f. 1.; and our *figs.* 1220. and 1221.

1220

Spec. Char., &c. Disk of leaf oblong; footstalk glabrous.

Anthers arrow-shaped, linear. (*Willd. Sp. Pl.*, iv. p. 338.)

A native of Minorca, Sardinia, and Corsica; and growing there, according to the *Nouveau Du Hamel*, to the height of 80 ft. It is also found in great abundance on all the rocky surfaces both of European and Asiatic Turkey. It was first brought to France about 1770; whence it was introduced into England in 1780. In both countries, it was at first treated as a green-house plant; but it was afterwards found quite hardy. In Paris, according to the *Nouveau Du Hamel*, it was found to resist the severe frosts of 1794 and 1799. The Balearic box is a very handsome species, with leaves three times as large as those of *B. sempervirens*, and a straight smooth trunk. The leaves, when the plant is fully exposed to the air, are of a much paler green than those of the common box; but, when they are in the shade, they are of an intensely deep green. The wood is said to be of a brighter yellow than that of the common box. It is sent to England in large quantities from Constantinople, for the use of the wood-engravers; but, being of a coarser grain, it is inferior to that of the *B. sempervirens*. It is propagated by cuttings, which, if placed in sandy soil under glass, or in heat, generally strike root in about two months after being taken off. Cuttings will also succeed, if treated like those of the common box.

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Statistics. The largest plant within 10 miles of London is at Kew, where it is 13 ft. high. At Walton on Thames, at Lady Tankerville's, it is 10 ft. high. In Sussex, at Arundel Castle, it is 17 ft. high. Price of plants, in the London nurseries, 1s. 6d. each; at New York, where it requires protection during winter, 37½ cents.



1221

App. i. *Half-hardy Species of Buxus.*

B. chinensis Lk. is a native of China, introduced in 1802, and growing about 3 ft. high; and *B. australis* Cun. is a native of New Holland, growing about 6 ft. high. Both require protection during winter, but would probably succeed against a conservative wall.

A true species of *Buxus*, Mr. Royle observes, is common in the Himalayas, found chiefly in valleys, as at Mugra, Kamaon, &c. It grows to a considerable size and thickness, and the wood appears as compact and good as that of the common box.

App. I. *Half-hardy Species belonging to the Order Euphorbiacæ.*

On looking over the genera belonging to this order in the *Hortus Britannicus*, several ligneous species will be observed indicated as requiring the green-house; but, as very few of them are of much beauty, we consider it unnecessary to go into many details respecting them.

Plagianthus divaricatus Forst., t. 43., is a native of New Zealand, and was introduced in 1822. It is tolerably hardy; a plant having lived with us at Bayswater, with very little protection, since 1829. *P. sidoides* Hook. Bot. Mag., t. 3396., is a twiggly shrub, from 2 ft. to 3 ft. high, probably also as hardy as the other. Both species flower in April.

Cluyfia alaternoides Bot. Mag., t. 1321., has been an inhabitant of our green-houses since 1692. It is a native of the Cape of Good Hope, and would probably stand against a conservative wall.

CHAP. C.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER URTICA'CEÆ.

THESE are included in five genera, which have their names and characters below.

MORUS *Tourn.* Flowers unisexual; those of the 2 sexes, in most species, upon the same plant; in *M. nigra* *Poir.*, and, according to Gronovius (*Virg.*, 146.), in *M. rubra* *L.*, upon distinct plants: according to Kalm (*Act. Suec.*, 1776), the sexes of *M. rubra* *L.* are polygamous.—Male flowers disposed in a drooping, peduncled, axillary spike. Calyx of 4 equal sepals, imbricate in æstivation, expanded in flowering. Stamens 4. A rudiment of a pistil is present.—Female flowers in ovate erect spikes. Calyx of 4 leaves, in opposite pairs, the outer pair the larger, all upright and persistent, becoming pulpy and juicy. Ovary of 2 cells, one including one pendulous ovule, the other devoid of any. Stigmas 2, long. In the state of ripeness, each ovary is a fleshy and juicy utricle, and is covered by the fleshy and juicy calyx: the aggregate of the ovaries and the calyxes from a spike of flowers constitutes what is termed a mulberry. Seed pendulous.—Species several; natives of Asia, south of Europe, and North America. Trees. Sap white. Leaves alternate, large, mostly lobed, and rough; the favourite food of the silk-moth (*Bómbyx mori* *F.*) in its caterpillar state. (Chiefly from *T. Nees ab Esenbeck, Gen. Pl. Fl. Germ.*)

BROUSSONETIA *L'Hérit.* Flowers unisexual; those of the two sexes upon distinct plants.—Male flowers in pendulous cylindrical catkins; each flower in the axil of a bractea. Calyx shortly tubular, then 4-parted. Stamens 4, elastic.—Female flowers in peduncled, axillary, upright globular heads. Calyx tubular, its tip with 3—4 teeth. Ovary within an integument that arises from the bottom of the calyx. Style lateral, prominent. Stigma taper. Fruit club-shaped, proceeding from the bottom of the calyx, and extended much beyond its tip; and consisting of the integument in which the ovary was enclosed, and now become very juicy; and of a 1-seeded oval utricle with a crustaceous integument, and enclosed within the juicy integument.—Species 1, native to Japan and the isles of the Pacific Ocean. A tree, with leaves large, lobed or not, and hairy. (*Du Hamel, Traité des Arbres*, ed. nouv.; and the *Penny Cyclopædia*.)

MACLURA *Nuttall.* Flowers unisexual; in *M. aurantiaca* *Nutt.*, and *M. tinctoria* *D. Don*, those of the two sexes upon distinct plants; if not so in the rest, then upon the same plant. What follows relates to *M. aurantiaca* *Nutt.*—Male flowers in a very short almost sessile racemose panicle of 12 or more flowers. Calyx 4-parted. Stamens 4, in some instances 3.—Female flowers closely aggregate upon an axis, and forming a globular head that is borne upon a short axillary peduncle. Calyx oblong, urceolar, apparently with 4 lobes at the tip: it includes the ovary, which is situated above its base, and is terminated by a style that is thread-shaped, downy, and protruded beyond the calyx to the length of nearly 1 in. The ovary becomes an achenium about $\frac{3}{8}$ in. long, half as much broad, compressed, oval, with the tip blunt and unsymmetrical from an indentation on one side in which the style had been attached.—A tree, native of North America. Spiny: spines axillary. Sap white. Leaves alternate, ovate. Stipules minute, deciduous. (*Nuttall; Gard. Mag.*, vol. xi. p. 312—316., and vol. xii. p. 210.; and observation.)

FRUCUS Tourn. Flowers inserted upon the interior surface of a hollow glo-
bular or pear-shaped fleshy receptacle, in whose tip is an orifice closed with
small scales; minute, many within a receptacle; those in the upper part
male, the rest female; or the flowers of each sex occupy distinct receptacles
upon distinct plants. — Male flower. Calyx 3-parted. Stamens 3. — Fe-
male flower. Calyx 5-cleft, having a tube that invests a thread-shaped
stalk that bears the pistil. Stalk adnate to the ovary on one side, and
extending to the base of the style: the style is inserted rather laterally.
Ovary with 1 cell and 1 ovule. Stigmas 2. Fruit a utricle. Seed pen-
dulous. Embryo falcate, in the centre of fleshy albumen. — Species nume-
rous. Trees or shrubs, occurrent in the warmer regions of both hemi-
spheres. *F. Cáríca* inhabits the south of Europe. Sap white. Leaves
alternate, stipulate. Stipules large, convolute, deciduous. (*T. Nees ab*
Esenbeck, Gen. Pl. Fl. Germ. Most of the characters are taken from *F.*
Cáríca L.)

BO'RYA Willd. Flowers unisexual: those of the two sexes upon distinct
plants. — Male flower. Calyx minute, in 4 deep segments. Stamens 2—3.
— Female flower. Calyx inferior, in 4 deep segments, that are deciduous;
two opposite ones very minute, and in some instances not present. Ovary
roundish-ovate: it has 2 cells. Style short. Stigma capitate, depressed,
obscurely cloven. Fruit pulpy, oval-oblong, with 1 cell. Seed mostly soli-
tary; its skin membranous, its embryo straight, its albumen horny.—Species
5; 4 native of North America, 1 of the West Indies: all shrubs, with their
leaves opposite, or nearly so, mostly smooth and entire; and their flowers
minute, axillary, fascicled and bracteated. (*Smith*, under *Bigelovia* in *Rees's*
Cycl.; *Nuttall* in *Gen.*; and observation.)

GENUS I.



MORUS Tourn. THE MULBERRY TREE. *Lin. Syst. Monœ'cia Tetrándria.*

Identification. Tourn., quoted by T. Nees ab Esenbeck, in his *Gen. Pl. Fl. Germ.*; Schreb. *Lin.*
Gen. Pl., No. 1424; Willd. *Sp. Pl.*, 4 p. 368.; T. Nees ab Esenbeck *Gen. Pl. Fl. Germ.*, fasc. 3.
No. 5.

Synonymes. Mûrier, *Fr.*; Maulbeere, *Ger.*

Derivation. Several derivations have been given for the word *Morus*: some suppose it to be taken
from the Greek word *morea*, or *moron*, signifying a mulberry or blackberry; others derive it from
mauros, dark; and Sir J. E. Smith suggests that it may have been taken by antiphrasis from *moros*,
foolish, the mulberry tree, from its slowness in putting out its leaves, being anciently considered
the emblem of wisdom. The *Morea*, in the Levant, is said to be so called from the resemblance
of the shape of that peninsula to the leaf of a mulberry.

Description, &c. Deciduous trees, natives of Europe, Asia, and America,
remarkable for their large leaves, which are mostly lobed, and which, in a state
of cultivation, are liable to great variation in point of magnitude, form, and
texture. They are easily propagated by seeds, layers, cuttings, and trun-
cheons; every part of the mulberry, like the olive, taking root easily, and
forming a tree. All the species will serve to nourish the silkworm; but *M.*
álba, and its varieties, are considered much the best for this purpose. In
warm climates, such as Persia, the leaves of *M. nigra* are sufficiently succulent
for feeding the silkworm; but in colder countries they do not answer equally
well.

‡ 1. *M. NI'GRA Poir.* The black-fruited, or common, Mulberry.

Identification. Poir. *Ency. Méth.*, 4 p. 377.; *Lin. Sp. Pl.*, 1398.; *Hort. Cliff.*, 441.; *Mart. Mill.*, No. 2;
Willd. Sp. Pl., 4 p. 369.

Synonymes. *Morus Dod. Pempt.*, 810.; *M. fructu nigro Bauh. Pin.*, 459.

Engravings. Ludw. *Ectypa Veg.*, t. 114.; *Blackw.*, t. 126.; *Wats. Dend. Brit.*, t. 159.; *N. Du Ham.*,
4 t. 22.; and the plate in our last Volume.

Spec. Char., &c. Sexes monœcious, sometimes diœcious. Leaves heart-shaped,
bluntish, or slightly lobed with about 5 lobes; toothed with unequal teeth,

rough. (*Willd. Sp.*, iv. p. 369.) A deciduous tree, a native of Persia, but found also on the sea coast of Italy; growing to the height of 20 ft. or 30 ft. Introduced in 1548. Sir J. E. Smith remarks that this species is "sometimes perfectly dioecious, and very frequently partially so; the stamens being in greater perfection in most flowers of one tree, and the pistils in those of another." (*Rees's Cycl.*, art. *Morus*.)

Variety.

‡ *M. n. 2 laciniata* Mill. Dict., No. 2., has the leaves jagged rather than cut. This alleged variety of the species may be considered as more properly a variation of the individual; since leaves jagged and lobed in a great variety of ways are frequently found on plants in one season, and only heart-shaped comparatively entire leaves the next!

Description. The common mulberry is generally a low, much-branched tree, with a thick rough bark, and broad heart-shaped leaves, which are unequally serrated, and very rough. The fruit is large, of a dark purple, very wholesome, and agreeable to the palate. The mulberry tree is remarkable for the slowness of its growth; and also for being one of the last trees to develop its leaves, though it is one of the first to ripen its fruit. In Britain, the tree always assumes something of a dwarf or stunted character, spreading into very thick arms, or branches, near the ground, and forming an extremely large head. It is a tree of very great durability; the trees at Syon being said to be 300 years old, and some at Oxford and other places being supposed to be of nearly equal antiquity. It is also wonderfully tenacious of life; the roots of a black mulberry, which had lain dormant in the ground for twenty-four years, being said, after the expiration of that time, to have sent up shoots. (*Ann. des Scien. Nat.*, tom. ix. p. 338., as quoted in *Brande's Journ.* for Oct. 1827.)

Geography. The common, or black, mulberry is generally supposed to be a native of Persia, where there are still masses of it found in a wild state; though the date of its introduction into Europe is unknown; and though it is occasionally found apparently wild in Italy. It is, however, so frequently confounded by the earlier writers with the white mulberry, as to render it difficult to ascertain the countries of which it is really a native.

History. The black mulberry has been known from the earliest records of antiquity. It is twice mentioned in the *Bible*; viz. in the Second Book of Samuel, and in the Psalms. The same difficulty, however, exists in tracing its history distinctly from that of the white mulberry, as in its geography; and it is only when spoken of as a fruit tree, or when its colour is decidedly mentioned, that we can be sure which species is meant. Ovid, however, evidently points out the black mulberry as the one introduced in the story of Pyramus and Thisbe; and Pliny seems also to allude to it, as he observes that there is no other tree that has been so neglected by the wit of man, either in grafting or giving it names; an observation which holds good to the present day respecting the black mulberry, as it has only one trifling variety, or rather variation, and no synonyme; whereas there are numerous varieties of *M. álba*. Pliny adds, "Of all the cultivated trees, the mulberry is the last that buds, which it never does until the cold weather is past; and it is therefore called the wisest of trees. But, when it begins to put forth buds, it despatches the business in one night, and that with so much force, that their breaking forth may be evidently heard." (Book xvi. c. 25.) The black mulberry was first brought to England in 1548; when some trees were planted at Syon, one, at least, of which (*fig. 1222.*) is still in existence. Others say that the first mulberry tree planted in England was in the garden at Lambeth Palace, by Cardinal Pole, about 1555. The tree is mentioned by Tusser, and also by Gerard, who describes both the black and the white mulberry as being cultivated in his time. The royal edict of James I., about 1605, recommending the cultivation of silkworms, and offering packets of mulberry seeds to all who would sow them, no doubt rendered the tree fashionable, as

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there is scarcely an old garden or gentleman's seat, throughout the country, which can be traced back to the seventeenth century, in which a mulberry tree is not to be found. It is remarkable, however, that, though these trees were expressly intended for the nourishment of silkworms, they nearly all belong to *Morus nigra*, as very few instances exist of old trees of *Morus álba* in England. (See *Bradley's Treat. on Husb. and Gard.*, ed. 1726, vol. i. p. 349.) Shakspeare's mulberry is referable to this period, as it was planted in 1609 in his garden at New Place, Stratford; and it was a black mulberry, as Mr. Drake mentions a native of Stratford, who, in his youth, remembered frequently to have eaten of the fruit of this tree, some of its branches hanging over the wall which divided that garden from his father's. (*Drake's Shakspeare*, vol. ii. p. 584.)

Properties and Uses. The black mulberry is cultivated, Du Hamel tells us, "for its fruit, which is very wholesome and palatable; and not for its leaves, which are but little esteemed for silkworms;" and which, at the beginning of autumn, often become covered with red spots. The fruit, he adds, is eaten raw, or "made into syrups, which are considered excellent for sore throats." (*Nouv. Du Ham.*, iv. p. 91.) The wood is considered of but little value in France, except for fire-wood: it is less compact than even that of the white mulberry; and weighs only 40 lb. 7 oz. the cubic foot. Cattle eat the leaves, and all kinds of poultry are very fond of the fruit.

In England, the fruit is generally eaten at the dessert; and it is considered of a cooling aperient nature when ripe. It forms an agreeable sweetmeat, though it is not generally used for that purpose; and Evelyn says that, mixed with the juice of cider apples, it makes a very strong and agreeable wine. Dr. Clarke mentions that he saw some Greeks in the Crimea employed in distilling brandy from mulberries; which he describes as "a weak but palatable spirit, as clear as water." (*Travels*, vol. i. p. 529.) A wine is also made from it in France; but it requires to be drunk immediately, as it very soon becomes acid. The root has an acrid bitter taste, and is considered excellent as a vermifuge, in doses of half a drachm in powder. (*Smith in Rees's Cycl.*) The tree in every part contains a portion of milky juice, which, being coagulated, is found to form a kind of coarse Indian rubber. In some parts of Spain, on Mount Ætna, and in Persia, the leaves of this species are said to be preferred to those of the white mulberry for silkworms. (*Hook. Bot. Comp.*, vol. i. p. 59.)

Poetical and mythological Allusions. The mulberry was dedicated by the Greeks to Minerva, probably because it was considered as the wisest of trees; and Jupiter the Protector was called Morea. Ovid has celebrated the black mulberry tree in the story of Pyramus and Thisbe; where he tells us that its fruit was originally snow-white; but that when Pyramus, in despair at the

supposed death of his mistress, killed himself with his own sword, he fell under one of these trees; and when Thisbe, returning and finding him dead, stabbed herself also, their blood flowing over the roots of the tree, was absorbed by them, and gave its colour to the fruit.

‘Dark in the rising tide the berries grew,
And, white no longer, took a sable hue;
But brighter crimson, springing from the root,
Shot through the black, and purpled o’er the fruit.’

Cowley describes the black mulberry as being used, in his time, both for its fruit and leaves:—

“But cautiously the mulberry did move,
And first the temper of the skies would prove,
What sign the sun was in, and if she might
Give credit yet to Winter’s seeming flight:
She dares not venture on his first retreat,
Nor trusts her fruit and leaves to doubtful heat;
Her ready sap within her bark confines,
Till she of settled warmth has certain signs;
Then, making rich amends for the delay,
With sudden haste, she dons her green array:
In two short months, her purple fruit appears,
And of two lovers slain the tincture wears,
Her fruit is rich, but she doth leaves produce
Of far-surpassing worth and noble use.”

COWLEY on *Plants*, book v.

The destruction of Shakspeare’s mulberry tree in 1756, by its then proprietor, Mr. Gastrell, gave rise to several songs, and other pieces of poetry; but they rather relate to the individual tree than to the species.

Soil, Situation, Propagation, and Culture. The black mulberry will grow in almost any soil or situation that is tolerably dry, and in any climate not much colder than that of London. In Britain, north of York, it requires a wall, except in very favourable situations. It is very easily propagated by truncheons or pieces of branches, 8 ft. or 9 ft. in length, and of any thickness, being planted half their depth in tolerably good soil; when they will bear fruit the following year. (See *Gard. Mag.*, vol. iii. p. 217., and vol. v. p. 63.) Every part of the root, trunk, boughs, and branches may be turned into plants by separation; the small shoots, or spray, and the small roots, being made into cuttings, the larger shoots into stakes, the arms into truncheons, and the trunk, stool, and roots being cut into fragments, leaving a portion of the bark on each. (*Ibid.*, vol. iv. p. 152.) It is very seldom, if ever, now propagated by seeds, which rarely ripen in Britain. The mulberry, from its slowness in putting out its leaves, being rarely injured by spring frosts, and its leaves being never devoured by any insect, except the silkworm, and never attacked by mildew, very seldom fails to bear a good crop of fruit. This fruit, however, though excellent and extremely wholesome, does not keep, and is so far troublesome, that it is only good when it is just quite ripe, and is best when it is suffered to fall from the tree itself. For this reason, mulberry trees are generally planted on a lawn or grass-plot, to prevent the fruit that falls from being injured by the dirt or gravel. In a paper by J. Williams, Esq., of Pitmaston, published in the *Horticultural Transactions* for 1813, this practice is, however, censured. “The standard mulberry,” says Mr. Williams, “receives great injury by being planted on grass-plots with the view of preserving the fruit when it falls spontaneously. No tree, perhaps, receives more benefit from the spade and the dunghill than the mulberry; it ought therefore to be frequently dag about the roots, and occasionally assisted with manure. The ground under the tree should be kept free from weeds throughout the summer, particularly when the fruit is ripening, as the reflected light and heat from the bare surface of the soil is thus increased; more especially if the end branches are kept pruned, so as not to bow over too near to, and shade, the ground. The fruit is also very fine if the tree is trained as an espalier, within the reflection of a south wall, or other building. If a wooden trellis were constructed, with the same inclination as the roof of a forcing-house, fronting the south, and raised about

6 ft. from the ground, leaving the soil with the same inclination as the trellis, a tree trained on it would receive the solar influence to great advantage, and would probably ripen its fruit much better than a standard." (*Hort. Trans.*, &c.) When the mulberry is trained against a wall, and required to produce very large and fine fruit, the following mode of pruning is recommended by Mr. Williams:—"All the annual shoots, except the foreright, are neatly trained to the wall; but these last must be left to grow till towards midsummer, and then be shortened about one third of their growth, to admit light to the leaves beneath. By the end of August, the foreright shoots will have advanced again, so as to obstruct the light, and they must then be shortened nearer to the wall than before. In the month of March or beginning of April, the ends of the terminal shoots should be pruned away down to the first strong bud that does not stand foreright; and the front shoots, which were pruned in August, must also be shortened down to two or three eyes. If trained after this method, the tree will afford fruit the third year. The foreright shoots should then be shortened at the end of the month of June, or beginning of July, so as to leave one leaf only beyond the fruit; the terminal shoots being nailed to the wall as before, and left without any summer pruning; the foreright shoots, thus nailed, will not advance any farther, as their nutriment will go into the fruit; which, when quite ripe, will become perfectly black, very large, and highly saccharine." (*Ibid.*) As a standard tree, whether for ornament, or the production of moderately sized fruit, the mulberry requires very little pruning, or attention of any kind, provided the soil be tolerably good.

Statistics. *Morus nigra* in the Environs of London. The oldest tree (supposed to be planted in the 16th century, by the botanist Turner), is at Syon, where it is 22 ft. high. (See fig. 1222 in p. 1345.) There is another tree 28 ft. high, diameter of trunk 3 ft. 3 in., and of the head 57 ft. At Hampstead, at Kenwood, 38 years planted, it is 25 ft high, diameter of the trunk 1 ft. 1 in., and of the head 25 ft.; and at Mount Grove, Middlesex, 12 years planted, it is 9 ft. high, diameter of the trunk 2½ in. At Battersce, on the estate of Earl Spencer, one, 300 years old, is from 30 ft. to 40 ft. high, the diameter of the head 70 ft. by 50 ft.; with 14 trunks, averaging about 1 ft. in girt at 1 ft. from the ground.

M. nigra South of London. In Devonshire, at Bystock Park, 22 years planted, it is 17 ft. high, diameter of the trunk 7 in. In Kent, at Canterbury, in a garden which belongs to the ruins of the Abbey of St. Augustine, is a mulberry tree of great antiquity. It had once been a tree of considerable height; but is supposed to have been blown down about the end of the 17th, or beginning of the 18th, century. The trunk lies horizontally along the ground; and is in length 2¼ ft., and about 2 ft. in diameter, at 4 ft. from the root. Two large branches have risen perpendicularly from this trunk, and now form trees with trunks, the one 8 ft. high, and about 14 in. in diameter, where it proceeds from the main trunk; and the other still higher and thicker. This tree was inspected by the deputation of the Caledonian Horticultural Society, when on their way to France, in August, 1817. "On examination" they "perceived that a continuous portion of the bark was fresh all the way from the original root; and by removing a little of the earth" they "likewise ascertained that many new roots, though of small size, had been sent off from the base of the two branches; which had formed themselves into stems and heads." "The fruit of this aged tree," the deputation add, "is excellent; indeed it is commonly said that the fruit of the oldest mulberry trees is the best. In 1815, the berries, sold at 2s. a pottle, yielded no less than 6 guineas." (*Journal of a Hort. Tour*, &c., p. 14.) We are informed by Mr. Masters of Canterbury, that this tree has increased considerably in size since 1817; the two trees being now, the one 19 ft. high, with a head 25 ft. in diameter; and the other 16 ft. high, with a head 20 ft. in diameter. In Somersetshire, at Hinton House, 45 years planted it is 14 ft. high, diameter of the trunk 6 in., and of the head 13 ft.; at Nettlecombe, 45 years planted, it is 24 ft. high, diameter of the trunk 1 ft. 4 in., and of the head 26 ft. In Surrey, near Ripley, at Sutton Place, is a very old mulberry tree, which must have been blown down early in the 18th century, as the branches from the prostrate trunk have all the appearance of old trees. The house at Sutton Place was built by the brewer of Henry VIII., about the end of that king's reign. In Sussex, at Cowdray, it is 25 ft. high, with a trunk 1 ft. 8 in. in diameter. In Wiltshire, at Wardour Castle, 100 years old, it is 40 ft. high, diameter of the trunk 1 ft. 6 in., and of the head 26 ft.

M. nigra North of London. In Bedfordshire, at Amptill, 85 years planted, it is 25 ft. high, diameter of the trunk 25 in., and of the head 30 ft. In Cambridgeshire, in the grounds of Christ Church College, at Cambridge, is one planted by Milton when a student of the college, 20 ft. high, diameter of the trunk 2 ft. 2 in., and of the head 30 ft. In Cheshire, at Kinnel Park, it is 20 ft. high, diameter of the trunk 16 in., and of the head 20 ft. In Cumberland, at Ponsobny Hall, 45 years planted, it is 24 ft. high, diameter of the trunk 1 ft. 2 in., and of the head 18 ft. In Gloucestershire, at Doddington, 50 years planted, it is 25 ft. high, diameter of the trunk 1½ ft., and of the head 90 ft. In Leicestershire, at Whetton House, 26 years planted, it is 13 ft. high, against a wall, circumference of the trunk 1 ft. 4 in., and of the head 70 ft. In Oxfordshire, in the Common Room Garden, at Pembroke College, are two mulberry trees, which are said to have been planted before the college was founded, which was in 1624. One of these is only about 25 ft. high, but it has a trunk 2 ft. 2 in. in diameter at 4 ft. from the ground; a little higher it divides into two large arms, one of which girts 5 ft., and the other 3 ft. 1 in. The other tree appears to have been much larger, but is now decayed. In Pembrokehire, at Golden Grove, 60 years planted, it is 25 ft. high, diameter of the trunk 2 ft., and of the head 14 ft. In Radnorshire, at Maeslaugh Castle, 26 ft. high, diameter of trunk 1 ft., and of the head 30 ft. In Rutlandshire, at Belvoir Castle, 10 years planted, it is 15 ft. high, diameter of the trunk 4 in., and of the head 8 ft. In Suffolk, at Finborough Hall, 70 years planted, it is 40 ft. high, diameter of the trunk 2 ft., and of the head 42 ft.; at Ampton Hall, 12 years planted, it is 10 ft. high, diameter of the trunk 6 in., and of the head 16 ft. In Worcestershire, at Croome, 40 years planted, it

is 30 ft. high, diameter of the trunk 15 in., and of the head 25 ft. At Hagley, 20 years old, it is 10 ft. high, diameter of trunk 18 in., and of the head 11 ft.

M. nigra in *Scotland*. The following specimens are all against walls. In Mid-Lothian, at Gosford House, 15 ft. high, diameter of the trunk 1 ft. 3 in., and of the space covered by the branches 21 ft. In Haddingtonshire, at Tynningham, 14 ft. high, diameter of the trunk 1 ft. 8 in., and of the head 30 ft. In Renfrewshire, at Erskine House, 15 ft. high, diameter of the trunk 1 ft. 2 in., and of the head 17 ft. In Banffshire, at Gordon Castle, 12 ft. high, against a wall. In Perthshire, at Kinfauns Castle, 8 years planted, and 4 ft. high. In Ross-shire, at Brahan Castle, 6 years old, and 10 ft. high, extent of the branches 18 ft.

M. nigra in *Ireland*. Near Dublin, in the grounds at Terenure, there is a remarkable specimen, the trunk of which divides, close by the ground, into five limbs, nearly of equal bulk, the largest exceeding 10 in. in diameter, height 25 ft., circumference of the head 130 ft. At Castletown, 30 ft. high, diameter of the trunk 2 ft. 6 in., and of the head 30 ft. In Galway, at Coole, 14 ft. high, diameter of the trunk 8 in., and of the head 14 ft. In Sligo, at Makree Castle, 8 years old, it is 8 ft. high, diameter of the trunk 5 in., and of the head 7 ft.

M. nigra in *Foreign Countries*. In France, at Nantes, in the nursery of M. De Nerrières, 60 years planted, it is 49 ft. high, with a trunk $\frac{3}{4}$ ft. in circumference. In the Botanic Garden, at Avranches, 40 years planted, it is 40 ft. high, the diameter of the trunk 1 ft., and of the head 20 ft. In Saxony, at Wörlitz, 30 years old, it is 19 ft. high; the diameter of the trunk 6 in. In Cassel, at Wilhelmshöhe, 7 years planted, it is 6 ft. high. In Bavaria, at Munich, in the Botanic Garden, 18 years planted, it is 20 ft. high. In Austria, near Vienna, at Brück on the Leytha, 42 years old, it is 33 ft. high, the diameter of the trunk 9 in., and of the head 15 ft. In Prussia, near Berlin, at Sans Souci, 70 years old, it is 30 ft. high, the diameter of the trunk 14 in., and of the head 11 ft. In the Pfauen Insel, 40 years old, it is 30 ft. high, the diameter of the trunk 13 in., and of the head 44 ft.

‡ 2. *M. ALBA* L. The white-fruited Mulberry Tree.

Identification. Lin. Hort. Cliff., 441.; Mill. Dict., No. 3.; Willd. Sp. Pl., 4. p. 368.; N. Du Ham., 4. p. 87.

Synonymes. *M. candida* Dod. *Pempt.*, 810.; *M. fructu albo* *Bauh. Pin.*, 459.; *M. alba fructu minori* also insulso *Du Ham. Arb.*, 2. p. 24.

Engravings. Schkuhr *Handb.*, 3. 290.; T. Nees ab Esenbeck *Gen. Pl. Fl. Germ.*, fasc. 3. No. 5. f. 1-6., the male; and our plate in Vol. III.

Spec. Char., &c. Leaves with a deep scallop at the base, and either heart-shaped or ovate, undivided or lobed, serrated with unequal teeth, glossy, or, at least, smoothish; the projecting portions on the two sides of the basal sinus unequal. (*Willd. Sp. Pl.*) A deciduous tree, growing to the height of 30 ft. A native of China. Introduced in 1596; flowering in May, and ripening its fruit in September.

Varieties.—These are extremely numerous; and the same kinds are even distinguished in different countries by different names. The following are some of those most generally cultivated for their leaves, as affording food for the silkworm:—

‡ 2. *M. a. 2 multicaulis* Perrottet in *Ann. de la Soc. Lin. de Paris*, Mai, 1824, p. 129., *Lodd. Cat.*, ed. 1836; *M. tatárca* *Desf.*, but not of *Lin.* or *Pall.*; *M. bullata* *Balbis*; *M. cucullata* *Hort.*; Chinese black Mulberry, *Amer.*; Perrottet Mulberry, many-stalked Mulberry; Mûrier Perrottet, *Fr.*; Mûrier à Tiges nombreuses, Mûrier des Philippines, *Ann. des Sci.*, i. p. 336. pl. 3.; and our fig. 1223.; Moro delle Filippine, *Ital.*—This variety was introduced into France, in 1821, by M. Perrottet, "agricultural botanist and traveller of the marine and colonies of France," from Manilla, the capital of the Philippine Islands; into which country it had



been brought as an ornamental tree, some years previously, from China. It is considered, both in Italy and France, as by far the best variety for cultivation as food for the silkworm. It is a tree, or, rather, a gigantic shrub, as the name implies, of rapid growth, with vigorous shoots, and large pendulous leaves, which, even in poor dry soils, are 6 in. long, and 8 in. or 9 in. broad; but which, in rich humid soils, are often 1 ft. in breadth, and 15 in. or 16 in. in length. They are convex on the upper surface, of a beautiful glossy green, and of a succulent texture. The fruit of this variety was unknown in Europe till 1830. It is long, black, and of a flavour some-

what resembling that of the common black mulberry. This variety of mulberry differs from all the others, in throwing up suckers freely from the roots. It also strikes more readily by cuttings, either of the young or old wood, than any other variety. It is extensively propagated in the French and Italian nurseries; and it has also become a favourite variety in North America. In the *Gardener's Magazine*, vol. xii., the numerous good qualities of this variety will be found pointed out in detail, by Signor Manetti of Monza. See, also, Kenrick's *American Orchardist*, and the *American Gardener's Magazine*, vol. i. p. 310. and 336., and vol. ii. p. 33. From the colour and excellence of the fruit, we think it highly probable that this sort of mulberry belongs rather to *M. tatárca Pall.*, than *M. álba*.

- ‡ *M. a. 3 Morettiána Hort.*, Lodd. *Cat.*, ed. 1836; Dandolo's Mulberry; has black fruit, and very large, perfectly flat, deep green, shining leaves, which are thin, and perfectly smooth on both surfaces. Its leaves rank next to those of *M. a. multicaúlis* as food for silkworms; and the silk made by worms fed on them is of a beautiful gloss, and of a finer quality than any other. It is, however, neither so productive nor so hardy as *M. a. multicaúlis*. It was first brought into notice in 1815, by M. Moretti, professor in the university of Pavia; whence its name of *Morettiána*. Its name of Dandolo Mulberry was given in honour of Count Dandolo, who has not only devoted much time to the improvement of the culture of the silkworm, but has written an excellent work on the subject.
- ‡ *M. a. 4 macrophýlla* Lodd. *Cat.*, ed. 1836; *M. a. latifolia Hort.*; *M. hispánica Hort.*; *Mûrier d'Espagne*, *Feuille d'Espagne*, *Fr.*—This variety produces strong and vigorous shoots, and large leaves, sometimes measuring 8 in. long, and 6 in. broad, resembling in form those of *M. nigra*, but smooth, glossy, and succulent. The fruit is white. If grown in rich soils, this sort, it is stated in the *Nouveau Cours d'Agriculture*, is apt to produce leaves which are so exceedingly succulent and nourishing, that they occasion the worms fed on them to burst. It is a most valuable variety for poor soils, particularly in rocky calcareous situations.
- ‡ *M. a. 5 romána* Lodd. *Cat.*, ed. 1836; *M. a. ovalifolia*; *Mûrier romain*, *Fr.*; bears so close a resemblance to the above sort, as not to require any more particular description.
- ‡ *M. a. 6 nervosa* Lodd. *Cat.*, ed. 1836; *M. nervosa Bon Jard.*, 1836; *M. subálba nervosa Hort.*; has the leaves strongly marked with thick white nerves on the under side. There is a subvariety (*M. n. 2 longifolia*) mentioned in the *Bon Jardinier*, which has longer leaves.
- ‡ *M. a. 7 itálica Hort.*; *M. itálica Lodd. Cat.*, ed. 1836; has a lobed leaf. In 1825, and for a few years before and after, while attempts were making to introduce the culture of silk into England and Ireland, this variety was principally planted. The plants were imported from the Continent, chiefly by Messrs. Loddiges. *M. a. i. rubra*, the *M. rubra* of Lodd. *Cat.*, ed. 1836, is a subvariety of this sort.
- ‡ *M. a. 8 ròsea Hort.*, Lodd. *Cat.*, ed. 1836; the small white Mulberry; *Mûrier rose*, *Feuille rose*, *Fr.*; is one of the kinds called, in France, a wild variety. The fruit is small, white, and insipid; and the leaves resemble the leaflets of a rose tree, but are larger. This kind is said to produce remarkably strong silk.
- ‡ *M. a. 9 columbássa* Lodd. *Cat.*, ed. 1836; *Columba*, *Fr.*; has small delicate leaves, and flexible branches. It is considered the most tender of all the kinds.
- ‡ *M. a. 10 membranácea* Lodd. *Cat.*, ed. 1836; *Mûrier à Feuilles de Parchemin*, *Fr.*; has large, thin, dry leaves.

‡ *M. a. 11 sinensis* Hort.; *M. sinensis* Hort.; *M. chinensis* Lodd. Cat., ed. 1836; the Chinese white Mulberry, Amer.; is a large-leaved variety.

§ *M. a. 12 pàmila* Nois., ? *M. a. nana* Hort. Brit., is a shrub, seldom exceeding 10 ft. high. There are plants bearing this name in the arboretum of Messrs. Loddiges, which have leaves nearly as large as those of *M. a. macrophylla*.

Other Varieties. All the above sorts are in the arboretum of Messrs. Loddiges; but in the catalogues of foreign nurserymen there are several other names. In the Humbeque Nursery, near Brussels, a number of varieties are cultivated for the American market, where the white mulberry is now much in demand; and a list of their names will be found in *Gardener's Magazine*, vol. xi. p. 539. Castelet, in his *Traité sur les Mûriers blancs*, which is generally considered the best work on the subject extant in France, divides the varieties of *M. álba*, now cultivated in Provence for their leaves, into two classes, the wild and the grafted; the latter being propagated by grafting, and the former by cuttings, layers, or seeds.

Wild Mulberries.

La Feuille rose.—This is the same as *M. a. 8 rosea*, mentioned above.

La Feuille dorée, M. a. lucida Hort., *M. lucida* Hort., which has large, heart-shaped, shining leaves, and small purplish fruit.

La Reine batarde has the leaves twice as large as those of the *Feuille rose*, and deeply toothed. This is probably the *Foglia zazola* of the Italians.

La Femelle.—Tree spiny, and sending forth its fruit before its leaves, which are trilobate.

Grafted Mulberries.

La Reine, which has shining leaves, much larger than any of the wild varieties; and ash-coloured fruit.

La grosse Reine.—This is a subvariety of *M. a. macrophylla*, which has the leaves of a very deep green, and the fruit black, instead of white.

La Feuille d'Espagne.—This variety is the same as *M. a. 4 macrophylla*, mentioned above.

La Feuille de flocs has the leaves of a very deep green, and growing in tufts at the extremities of the branches. The fruit is produced in abundance, but never arrives at maturity. This is probably the *Foglia doppia*, or double-leaved variety, of the Italian gardeners.

Besides these, there are many garden varieties in the French, German, and Italian nurseries.

Description, &c. The white mulberry is readily distinguished from the black, even in winter, by its more numerous, slender, upright-growing, and white-barked shoots. It is a tree of much more rapid growth than *M. nigra*, and its leaves are not only less rough and more succulent, but they contain more of the glutinous milky substance resembling caoutchouc, which gives tenacity to the silk produced by the worms fed on them. They are generally cordate and entire, but sometimes lobed, and always deeply serrated. The fruit of *M. álba* and its wild varieties is seldom good for human food, but it is found excellent for poultry; and, for this purpose, a tree of the species was formerly generally planted in the *basse cour* of the old French châteaux. (*Bosc.*) The fruit of *M. a. multicaulis*, and some other of the highly cultivated varieties, is not only eatable, but agreeable. The rate of growth of young plants is much more rapid than that of *M. nigra*; plants cut down producing shoots 4 ft. or 5 ft. long in one season; the tree attaining the height of 20 ft. in five or six years; and, when full grown, reaching to 30 ft. or 40 ft. Its duration is not so great as that of *M. nigra*.

Geography. The white mulberry is only found truly wild in China, in the province of Seres, or Serica; it is, however, apparently naturalised in many parts of Asia Minor and Europe; and nearly all its varieties are of European origin. It does not embrace so extensive a range of country as *M. nigra*, being unable to resist either great cold or great heat. In a cultivated state, it is found, as a road-side pollard tree, in many parts of France, Spain, Italy, and Germany as far north as Frankfort on the Oder. In England, it is not very common; and it is scarcely to be found in Scotland, even against a wall.

History, &c. The Chinese appear to have been the first to cultivate the mulberry for feeding silkworms; and they are supposed to have discovered the art of making silk 2700 years B. C., in the reign of the Emperor Hong, whose empress, Si-ling-chi, is said to have first observed the labours of the silk-

worms on wild mulberry trees, and applied their silk to use. From China, the art passed into Persia, India, Arabia, and the whole of Asia. The caravans of Seres, or Serica (the part of China where the silk was most abundantly produced), "performed long journeys, of 243 days, from the 'far coasts' of China to those of Syria. The expedition of Alexander into Persia and India first introduced the knowledge of silk to the Grecians, 350 years before Christ; and, with the increase of wealth and luxury in the Grecian court, the demand for silks prodigiously augmented. The Persians engrossed, for a time, the trade of Greece, and became rich from the commerce of silk, which they procured from China. The ancient Phœnicians also engaged in the traffic of silk, and carried it to the east of Europe; but, for a long time, even those who brought it to Europe knew not what it was, and neither how it was produced, nor where was situated the country of Serica, from which it originally came." (*Kenrick's Amer. Silk-Grower's Guide*, p. 11.; *N. Du Ham., 4.; Nouv. Cours d'Agric., &c.*) From Greece it passed into Rome; and, though the exact year of its introduction is unknown, it was probably about the time of Pompey and Julius Cæsar; the latter, we find, having used it in his festivals. In the reign of Tiberius, an edict was passed prohibiting the use of silk as effeminate. Heliogabalus, about 220, is said to have been the first emperor who wore a robe made entirely of silk; which then, and for some time afterwards, sold for its weight in gold. Aurelian, in 280, is said to have denied his empress, Severa, a robe of silk, because it was too dear. About the beginning of the sixth century, after the seat of the Roman empire had been transferred to Constantinople, two monks arrived at the court of the Emperor Justinian, from a missionary expedition into China: they had brought with them the seeds of the mulberry, and communicated to him the discovery of the mode of rearing silkworms. Although the exportation of the insects from China was prohibited on pain of death, yet, by the liberal promises and the persuasions of Justinian, they were induced to undertake to import some from that country; and they returned from their expedition through Bucharina and Persia to Constantinople in 555, with the eggs of the precious insects, which they had obtained in the "far country," concealed in the hollow of their canes, or pilgrim's staves. Until this time, the extensive manufactures of Tyre and Berytes had received the whole of their supply of raw silk from China through Persia. (See *McCulloch's Dict. of Com., Nouv. Cours*, and *Amer. Silk-Grower's Guide*.) "The eggs thus obtained were hatched in a hot-bed, and, being afterwards carefully fed and attended to, the experiment proved successful, and the silkworm became very generally cultivated throughout Greece." (*Sat. Mag.* vol. iii. p. 2.) The silkworm and the black mulberry were introduced simultaneously into Spain and Portugal by the Arabs, or Saracens, on their conquest of Spain in 711. When the silkworm was first introduced into the north of Europe, there appears little doubt but that it was fed on the leaves of the black mulberry. The white mulberry is more tender; and, putting forth its leaves much earlier than the black mulberry, it is more likely to be injured by spring frosts. It was, consequently, long confined to Greece; but, when Roger, king of Sicily, in 1130, ravaged the Peloponnesus, he compelled the principal artificers in silk, and breeders of silkworms, to remove with him to Palermo, and determined to try the white mulberry in that country. The white mulberry was accordingly transplanted into Sicily; and, flourishing in its fine climate, that island became the great mart of nearly all the raw silk required for the manufactures of Europe. On Mount Ætna, the *Morus nigra* is grown at an elevation of 2500 ft., for the silkworm, to the exclusion of *M. álba*, probably on account of the tenderness of the latter tree in that elevated region. (See Dr. R. A. Philippi on the vegetation of Mount Ætna, in the *Linnæa*, as quoted in *Hook. Comp. Bot. Mag.*, vol. i. p. 50.) In 1440, the white mulberry was introduced into Upper Italy; and, under the reign of Charles VII., the first white mulberry tree was planted in France, as it is said, by the Seigneur d'Allan; and it is added that this tree still exists at the gates of Montelimart. Silk manufactures were first established in France in 1480, at Tours. This was in the reign of Louis XI.; that monarch having invited

workmen from Italy to settle in France. The manufactures, thus established, were, however, at first entirely supplied with their raw silk from Piedmont and Sicily. In 1494, several of the great landed proprietors who had followed Charles VIII. in his Italian wars, brought with them, on their return from Naples and Sicily, some plants of the white mulberry, which they planted in Provence, in the vicinity of Montelimart. In 1520, Francis I., having taken possession of Milan, prevailed on some artisans of the city to establish themselves at Lyons; and, to encourage them to remain there, he granted them especial privileges and immunities. Henry II. and Charles IX. appear to have been the next sovereigns who endeavoured to promote the culture of the mulberry and the silkworm in France; and in the reign of the latter monarch, in 1564, François Traucat, a gardener of Nismes, formed a large nursery, expressly for raising white mulberry plants, from which he supplied all the south of France. Henry IV. was no sooner established on the throne, than he exerted himself to promote the culture of the silkworm throughout his dominions; and by his desire, Olivier de Serres, seigneur de Pradel, in 1601, formed a plantation of white mulberry trees in the garden of the Tuileries, where a large building for the silkworms was erected. (*Ann. d'Hort.*, vol. xviii. p. 130.) In 1603, an edict was passed for encouraging the planting of mulberry trees throughout France; promising to reward such manufacturers as had supported and pursued the trade for twelve years with patents of nobility. (See *M'Culloch's Dict. of Commerce*, p. 1029.) Under Louis XIII. the silk manufactures of France were neglected; but they were again brought under the attention of the government in the reign of Louis XIV.; whose minister, Colbert, seeing the advantages that might be drawn from the culture of mulberry trees, resolved to enforce it by every means in his power. He reestablished the royal nurseries; gave plants to all who desired them; and even planted by force the lands of those proprietors who were not willing to cultivate the trees voluntarily. This arbitrary measure disgusted the proprietors, and the mulberry plantations were soon suffered to decay. Colbert now tried more gentle measures; and he offered a premium of 24 sous for every mulberry that had stood in a plantation three years. This plan succeeded; and, in the course of a few years, mulberry plantations were general throughout France. (See *Nouv. Cours d'Agricult.*, art. Mûrier.) At present the silk manufactures of France constitute a very important part of her commerce; and some idea may be formed of the silk goods annually sent to England from that country, from the fact, that the quantity on which duty was paid, from 1688 to 1741, averaged 500,000*l.* a year. (*M'Culloch.*) It is, however, remarkable, that, notwithstanding the great quantity of silk now raised in France, the manufacturers of that country still import to the annual value of 30,000 francs of raw silk from Piedmont and Italy. The culture of silk was first introduced into Germany by Frederick II., who had mulberry trees planted extensively in different parts of his dominions; and the example was soon afterwards followed in Saxony, Austria, and in some of the smaller states. In Bavaria, the silk culture was commenced under the auspices of government, and of the Munich Agricultural Society, about 1820, at the recommendation of a highly patriotic individual, M. Hazzi. A great many mulberry plants have since been raised in the government nurseries, and distributed throughout the provinces (see *Gard. Mag.*, vol. v. p. 424.); but, on the whole, neither in this part of Germany, nor in any other, have the silk manufactures ever been considerable. In many of the southern states, pollarded mulberry trees may be seen bordering the highways; and in some of the cities silk goods are made from German silk; but the only establishments of this kind worth mentioning are at Vienna, at Roveredo in the Tyrol, at Creveldt, at Cologne, and at Berlin. The culture of silk has been introduced into Belgium (*Ann. d'Hort. de Paris*, vi. p. 368.), with every prospect of success; and the tree has also been planted in the southern states of Denmark. In Sweden, an attempt has been made to introduce silk culture in the southern provinces; but, as far as we have been able to learn, with very little success. In Russia, silk culture has been

commenced in the Crimea, by the planting of all the best varieties of *M. álba* in the government garden at Odessa; where, according to M. Descemet (*Tab. Hist., &c.*, p. 55.), they succeed perfectly. In Spain, the culture of silk was introduced, as we have already seen, by the Arabs; and it is universally allowed to have been in a highly flourishing state in the fifteenth century; but it has declined ever since; and at the present day, as Capt. S. E. Cook informs us, it is one of the most neglected branches of agriculture in Spain; being almost confined "to Valencia, Catalonia, Murcia, and a part of Grenada." (*Sketches in Spain, &c.*, vol. ii. p. 38.) In Egypt, the culture of silk was introduced some years since, by the Paçha Ibrahim, and it is in a prosperous state. *M. a. multicaúlis* is also mentioned among the trees that have been planted in the government gardens at Algiers. (See p. 178.)

The first record of silk in Britain is of a present sent by Charlemagne to Offa, king of Mercia, in 780, consisting of a belt and two silken vests. Silk is mentioned in a chronicle of the date of 1286, in which we are told that some ladies wore silk mantles at a festival at Kenilworth about that period; and, by other records, we find that silk was worn by the English clergy in 1534. Henry VIII. had the first pair of silk stockings that were ever seen in England sent to him from Spain; and Edward VI. had "a pair of long silk hose," from the same country, presented to him by Sir Thomas Gresham (who built the Royal Exchange); "a present which was thought much of." (*Howell's Hist. of the World*, iii. p. 222.) These stockings were cut out of a piece of silk, and sewed together, like the cloth hose that were worn previously; the first knit silk stockings were worn in England by Queen Elizabeth. Silk manufactures were introduced into England in the fifteenth century; but they do not appear to have made much progress "till the age of Elizabeth; the tranquillity of whose long reign, and the influx of the Flemings, occasioned by the disturbances in the Low Countries, gave a powerful stimulus to the manufacturers of England." (*M'Culloch.*) In 1609, James I., probably in imitation of Henry IV., passed his famous edict for introducing the culture of the silkworm into Britain (see p. 1344.); and from the *Issues of the Exchequer, &c.*, of his reign, lately published, it appears that he planted largely himself. One of the entries in this curious work is an order, dated Dec. 5. 1608, directing the payment to "Master William Stallenge" of the "sum of 935*l.*, for the charge of four acres of land, taken in for His Majesty's use, near to his palace of Westminster, for the planting of mulberry trees; together with the charge of walling, levelling, and planting thereof with mulberry trees," &c. By another entry, we find that the attempt to rear silkworms was not hastily abandoned; as it contains an order, dated January 23. 1618, nine years after the preceding one, for 50*l.* to be paid the keeper of His Majesty's house and gardens at Theobald's, "for timber-board, glass, and other materials, together with workmanship, for making a place for His Majesty's silkworms, and for making provision of mulberry leaves for them." Hartlib, in his *Legacy, &c.*, printed in 1652, quotes some passages from *Boneil on Mulberries*, a work, printed in 1609; and among others a letter from King James to his lords lieutenants, recommending the planting of mulberry trees, and offering them at 2 farthings each. (See *Legacy, &c.*, ed. 2., p. 59.) Though this attempt to rear silkworms in England proved unsuccessful, the manufacture of the raw material, supplied by other countries, was extraordinarily flourishing. The silk-throwsters (twisters) of the metropolis were united into a fellowship in 1562; and were incorporated in 1629. Though retarded by the civil wars in the time of Charles I. and the commonwealth, the manufacture continued gradually to advance; and so flourishing had it become, that it is stated in a preamble to a statute passed in 1666 (13 & 14 Chas. 2. c. 15.), that there were at that time no fewer than 40,000 individuals engaged in the trade. (*M'Culloch.*) A considerable stimulus was given to the English silk manufacture by the revocation of the Edict of Nantes in 1685; when above 50,000 French artisans took refuge in England. At this period, the consumption of silk goods was so great in England, that, besides the quantity

manufactured in the country, from 600,000*l.* to 700,000*l.* worth were imported annually. In 1719, the first silk mill was erected at Derby. After the failure of James I.'s attempts to establish the silkworms and the mulberry, no effort of any importance seems to have been made for many years; though several individuals had, at different times, reared the worms, and produced silk. In 1825, however, a company was established, under the name of "The British, Irish, and Colonial Silk Company," with a large capital, and under the direction of the celebrated Count Dandolo, whose treatise on the management of the silkworm, &c., is considered the best work extant on the subject in Italy. This company formed extensive plantations in England and Ireland, particularly near Slough, and near Cork; and Mr. John Heathcoat of Tiverton, Devonshire, one of its most influential members, invented a method of reeling which was attended with the most complete success. The company also formed plantations in Devonshire: but, after numerous trials, it was found that the climate of the British Isles was too humid for the production of useful silk; and the company was finally broken up, and its plantations destroyed, in 1829. For further details respecting this company, and its operations, see *Encyc. of Agric.*, 2d edit., p. 1105. The cause of the entire failure of this spirited undertaking, as well as that of James I., will, we think, be found in the following very judicious observations from the *Journal d'Agriculture des Pays-Bas*; which will show the impracticability of any future attempt to rear silkworms as an article of commerce in Britain, or in any similar climate:—"The mulberry tree is found in different climates; but the juice of the leaves grown in the north is much less suitable for the production of good silk, than that of the leaves of the south. In this respect, mulberry leaves and silk differ as much as wines, according to the climate and soil in which they are produced. In general, every climate and soil that will grow good wheat will produce large succulent mulberry leaves; but these leaves will, in many cases, be too nutritive; that is, they will have too much sap, and too much substance and succulency. The wild mulberry, with small leaves, answers better, for such a soil, than the grafted mulberry, with large leaves. A general rule, and one to be depended on, is, that the mulberry, to produce the best silk, requires the same soil and exposure that the vine does to produce the best wine. Experience has proved that silkworms nourished by leaves gathered from a dry soil succeed much better, produce more cocoons, and are less subject to those diseases which destroy them, than those which have been nourished by leaves produced by an extremely rich soil." (See *Gard. Mag.*, vol. iv. p. 52.) The silkworm was introduced into America by James I.; who, at the same time that he published his edict for the planting of the mulberry tree in England, sent over mulberry trees and silkworms to Virginia, accompanied by a book of instructions for their culture, and exhortations to the inhabitants to pursue it instead of that of tobacco. The worms thus introduced were partially cultivated; but, not being so lucrative as tobacco, rice, and indigo, they made but small progress till the time of Dr. Franklin. That truly great man established a silk manufactory at Philadelphia, which was put a stop to by the war of independence. Silk has still continued to be raised in some remote parts of the country; but it is only since about 1825 that any establishments have been formed on a large scale. It is now produced extensively through all the southern provinces of the United States; and it seems probable, from the heat and dryness of the American summers, that it will equal the silk of Italy. Since the introduction of *M. a. multicaulis* into America, which took place in 1831, an attempt has been made to obtain two crops in one year, which, it is said, is attended with every prospect of success. The same may be observed of the culture of silk in South America, in which it has been commenced at Rio Janeiro, the Caraccas, Buenos Ayres, and other places.

In India, the culture of the mulberry and the silkworm continues to be practised; but how far it will be promoted or retarded by the progress of this culture in Europe and America remains to be proved. It appears probable, however, from the superior climate of Eastern Asia, that, when general com-

merce is once free, it will far exceed its former extent. In Australia, the culture of silk has been commenced, and it appears likely to succeed in that fine climate; but very little, as yet, can be said on the subject with certainty. One great object that we have had in view, in giving this article at such length, is, the promotion of silk culture in that interesting part of the world.

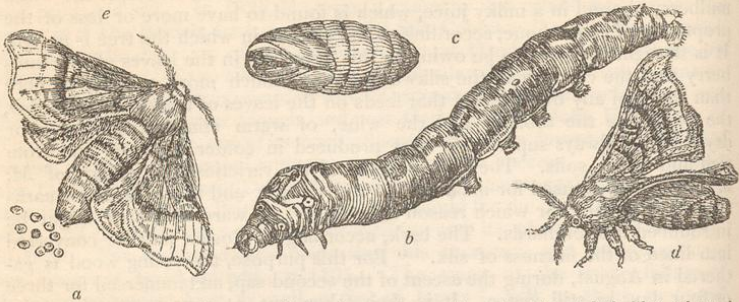
Properties and Uses. The bark, and more especially the leaves, of the white mulberry abound in a milky juice, which is found to have more or less of the properties of caoutchouc, according to the climate in which the tree is grown. It is thought by many to be owing to this property in the leaves of the mulberry that the cocoons of the silkworm have so much more tenacity of fibre than those of any other insect that feeds on the leaves of trees. Hence, also, the silk, like the tobacco and the wine, of warm climates, and of poor dry soils, is always superior to that produced in colder climates, and from rich and moist soils. The fruit of some of the varieties, particularly of *M. a. multicaulis*, is used for making robs and syrups; and is said to be remarkably good to eat; for which reason this variety, in warm climates, might be introduced into orchards. The bark, according to Rosier, may be converted into linen of the fineness of silk. "For this purpose, the young wood is gathered in August, during the ascent of the second sap, and immersed for three or four days in still water. It is then taken out, at sunset, spread on the grass, and returned to the water at sunrise. This is daily repeated; and, finally, it is prepared, and spun like flax." (*Amer. Silk-Grow. Guide*, p. 24.) The bark is also used, like that of the lime tree, for making bast for mats. The wood weighs only 44 lb. per cubic foot: that of the branches is used for vine props, posts and rails, and fire-wood; and that of the trunk for making wine casks, for which it is highly valued, as it is said to impart an agreeable violet-like flavour to white wines. (*Dict. des Eaux et Forêts*, &c.) By far the most important use of the white mulberry, however, is as food for the silk-moth; and this subject we shall here notice under two heads; viz. that of the management of the trees and leaves, and the management of the insects.

Mulberry Plantations. In India and China, these are made much in the same manner as those of the sugar-cane, and other agricultural plants. A field is laid out into squares of 5 ft. or 6 ft. on the sides; and in the centre of each square a hollow is formed; the soil stirred and manured; and five or six mulberry cuttings inserted in a group in the centre. These plants are never allowed to grow higher than 3 ft. or 4 ft.; being cut down to the ground every year, in the same manner as a raspberry plantation. In the south of Europe, the white mulberry is grown in plantations by itself, like willows and fruit trees; also in hedgerows, and as hedges; but in all cases the plants are kept low, for the convenience of gathering the leaves without injuring the trees; the greatest height they are suffered to attain being that of a pollard of 6 ft., which is annually lopped. In Guernsey, and the north of France, and also in some parts of Italy, the mulberry is chiefly grown as a hedgerow pollard, or as a pollard by the road side, in the same manner as fruit trees. (See p. 886.) The leaves of the mulberry should be gathered for feeding the silkworms, when perfectly dry, after the dew has disappeared in the morning. The person employed to gather them strips them off upwards, and deposits them in a bag kept open with a hoop, and provided with a loop and strap to pass over his shoulder. When the leaves are gathered, the trees must be stripped entirely of every leaf; as this is found not to injure the tree half so much as if only part of the leaves were taken off. In America, the operation of stripping off the leaves is often repeated a second time the same year; but, in France and Italy, the tree is very rarely subjected to so severe a trial. When labour is sufficiently cheap, the leaves are best cut off with a pair of scissors. After the first stripping, the white mulberry and all its varieties are very soon again covered with leaves; and, if all the leaves were removed at once, the tree does not appear to have been at all injured by the operation; but, if any leaves were left on, the tree will be found to have received a severe shock. According

to Count Dandolo, a hundred trees, great and small, will furnish 7,000 lb. of leaves, and these will be sufficient for 200,000 silkworms.

Management of the Silkworm. The silkworm is the popular name for the larva, or caterpillar, of the moth known to entomologists as the *Bombyx mori* Fab.; a native of China, which was introduced into Europe, as we have before seen, in 550. Fig. 1224. represents this insect, in its various stages,

1224



of the natural size; *a*, the eggs, which, when good, are of a pale slate or dark lilac colour; *b* is the larva, or caterpillar, when full grown; *c* is the insect in its chrysalis state, after the silk has been removed; *d* is the male imago, or perfect insect; and *e*, the female. When full grown, the larva is nearly 3 in. long, of a yellowish grey colour, with a horn-like process on the last joint of the body. The eggs, in Britain, may be purchased in Covent Garden Market, at 10s. per oz.; and care should be taken that they are of the proper colour; because those that are of a pale yellow colour are imperfect. They are preserved in a cool place, that is, in a temperature of from 10° to 12° Réaumur (55° to 59° Fahr.), till wanted for use, and will retain their vitality upwards of a year. To hatch them, a temperature of 86° Fahr. is required; for which purpose, in most parts of Europe where the silkworm is cultivated, the rooms used for that purpose are heated by stoves; though in the East Indies, in the Islands of France and Bourbon, &c., and in the southern parts of the United States, the natural temperature of the air is found sufficient. The houses in which the insects are kept are built with numerous windows, for the admission of air; and furnished with tables or shelves, on which the insects are kept. These shelves have movable ledges, of 1 in. or more in height, on each side, to confine the insects; and several stages of them may be formed one above the other, if care be taken that they are not attached to the wall, in order to admit a free circulation of air on every side. When the mulberry begins to unfold its leaves, it is time to commence the hatching of the eggs. These should be placed on the shelves in the temperature mentioned; and when they begin to turn white, which will be in about ten days, they should be covered with sheets of writing paper, turned up at the edges, and pierced full of holes with a large knitting needle. On the upper side of the paper should be laid some young twigs of mulberry, which the insects will smell; and, crawling through the holes in the paper, will begin to eat as soon as they are hatched. As fast as these twigs become covered with insects, they are carefully taken up and removed to another shelf, where they are placed on whity-brown or any absorbent paper, about one to every square inch. The silkworm changes its skin four times before it spins its cocoon. Its life is thus divided into five ages; during the first of which it had before. At this time it frequently appears to sleep, when it should on no account be disturbed. When the silkworm is in its second age, it may be fed with young leaves entire, or old ones chopped small; a great part of this age also is passed in sleep. During the third age the silkworms become more lively and vigorous, and they will devour full-grown leaves without cutting. In the fourth age the silkworm changes to a flesh colour, and eats greedily. In the fifth age the silkworm will eat the coarsest leaves, and it should be fed abundantly night and day, and have plenty of air and warmth. Each change is preceded by a day or two's apparent sickness and want of appetite in the insect, which becomes torpid before the change of its skin takes place. During the whole period of the silkworm's life, the litter made by the waste leaves, &c., must be frequently removed, the insects being attracted to one corner of their shelves with some fresh leaves, while the other parts are cleaned. When the caterpillars cease to eat, and run to and fro, frequently looking up, it is an indication that they are preparing to make their cocoons. They will now have become transparent, of a clear pearly colour, and the green circles round their bodies will have assumed a golden hue. Twigs of oak, tufts of dandelion, rolled up shavings from the cabinet-maker, cornets of paper, or sprigs of alaternus, phillyrea, heath, or broom, as may be the most convenient, are then placed on the tables or shelves, to serve as a support for the insects; the tables or shelves having been previously cleared of all litter, and the branches, or other materials, having been so arranged as to give the insects a feeling of security. They then immediately begin to make their cocoons, which are exuded in threads from the mouth, and which are generally completed in from four to seven days. When the insects have done working, the cocoons are taken from the twigs, and sorted; those that are double, or in any way imperfect, are thrown aside; a certain number are selected to breed from, and the rest are set apart for reeling the silk. The first operation with these last is to kill the insects enclosed. This is performed, in Italy, by exposing the cocoons to the heat of the sun for three days, from 10 o'clock A. M. to 5 o'clock P. M., when the thermometer stands at 88° Fahr. In France they are put into bags or baskets, and enclosed for half an hour in ovens heated to 88°; but in America they are generally placed in sieves or boxes, having perforated bottoms; these are covered very closely with a woollen cloth, and then placed over the steam either of boiling water, or boiling whiskey or rum. (See *New York Farm.*, vol. vi. p. 227.) The insects being killed, and the cocoons cleared of the external floss (which is manufactured under the name of floss, or spun, silk), they are thrown by handfuls into basins of pure soft water, placed over small furnaces of charcoal fires. When the water is almost at the boiling point, the cocoons are sunk with a whisk of broom or peeled birch under water for two or three minutes, to soften the gum and loosen the fibre. This, however, is unnecessary when they have been killed by the steam of boiling

spirts, the gum having been dissolved by the spirit. The whisk is then moved lightly about till the filaments adhere to it, and are drawn off. As soon as a sufficient number are collected, the reeling begins. (See *Amer. Silk-Grower's Guide*, *Murray on the Silkworm*; *Nouv. Cours d'Agric.*, &c.) If well fed, in a proper temperature, the caterpillars will have finished their labours in 24 days from the period of being hatched; and the quantity of silk produced will, other circumstances being equal, be in proportion to the quantity of food devoured: its quality will depend on the climate and soil in which the leaves have been grown. An ounce of eggs will produce about 40,000 caterpillars, which will consume 1073 lb. of leaves, and produce 80 lb. of cocoons, or about 8 lb. of raw silk. The worms are subject to numerous diseases, the most fatal of which is vulgarly called the tripes; and is brought on by wet or improper food. When any insects appear sick, they should be immediately removed from the rest, as all their diseases appear to be contagious. Wet leaves should never be given to silkworms, as they occasion disease; and it is better to let the insects fast for 24 hours, or even longer, than to give them leaves that are not perfectly dry. In wet weather, the branches of the tree should be gathered, and hung up in a dry place; or the leaves should be gathered, and spread out to dry. (*Nouv. Cours d'Agric.*, vol. xvi. p. 103.)

Substitutes for Mulberry Leaves in feeding the Silkworm. It is probable that the leaves of all the plants that contain a milky juice will, if they are eligible in point of texture, afford suitable food for the silkworm, from the common property of milky juice, that of containing caoutchouc. Accordingly, trials have been made with the tender leaves of the fig, with the leaves of the maclura, and of *Acer platanoides* and *A. tataricum*, among trees; and of lettuce, endive, beet, spinach, nettle, &c., among herbaceous plants. None of these substitutes, however, are of any real use, unless we except the maclura and the lettuce. The former, according to the *American Gardener's Magazine*, is thought likely to answer to a certain extent; as the lettuce and endive have done formerly, more especially when the plants have been allowed to send up their flower stalks before their leaves were gathered. In 1792, a Miss Croft of York sent a specimen of silk of her own raising to the Society of Arts, the worms producing which had been fed entirely on lettuce leaves.

Soil, Situation, Propagation, and Culture. The white mulberry is more tender than *Morus nigra*, and requires more care in choosing a situation for it. Calcareous soil is said to produce the best silk; and humid situations, or where the roots of the tree can have access to water, the worst. A gravelly or sandy loam is very suitable; and trees grown on hilly surfaces, and poor soils, always produce superior silk to those grown in valleys, and in rich soils. The tree is propagated by seeds, cuttings, layers, and grafting. To obtain seeds, the berries must be collected from trees which have been known to produce male catkins the preceding spring. The berries are either gathered when quite ripe, and left to become dry before the seed is separated from them; or they are put into water as soon as gathered, and rubbed so as to separate the seeds, which are cleansed from the pulp in the water, and then rubbed dry on a linen cloth, and either sown immediately, or mixed with sand, and kept till wanted for use. In the south of France, the seeds are sown as soon as the fruit is gathered, and the plants come up the same autumn; but, in colder climates, they are kept till spring, when they generally come up in three or four weeks, and require some protection, at first, during cold nights. In Germany, and in the north of the United States, the young plants are covered, during the first winter, with dry leaves or straw; and this covering, or mulching, is continued on the ground for three or four years, till the plants are thoroughly established, to protect their roots from the cold. The young plants are generally taken up and replanted the second spring, care being taken to place them in rows 4 ft. asunder, for the convenience of gathering the leaves. *M. a. multicaulis* is always propagated by layers or cuttings; the layers being made in spring or at mid-summer, and separated from the mother plant in autumn; or by cuttings of branches, or truncheons, which will root readily, and produce leaves for the worms the following year. Count Dandolo recommends grafting the species with the large-leaved varieties, near the ground, the third spring; but most writers on the silkworm appear to prefer seedling plants, or plants raised from layers or cuttings, to grafted ones. In pruning, cutting in, or heading down, the trees, the great object is to preserve the equilibrium of the heads, so that the sap may be equally distributed through the branches on every side. On this depends the production of a crop of leaves of equal quality on every part of the tree, which is alike important both for the first crop, which is given to the worms, and for the second crop, which is required for the nourishment of the tree.

Insects and Diseases. The leaves of the white mulberry are eaten by no insect but the silkworm: it is, however, attacked by numerous diseases, partly, no doubt, occasioned by the unnatural manner in which it is treated, by being stripped of its leaves. One of these diseases is brought on by any sudden

check given to the transpiration of the leaves, which turn yellow, and fall off, the tree dying in a few days. Another is the death of the roots, from the formation on them of a parasitic fungus. In both cases, nothing is to be done, but to remove the tree, and replant. The leaves are also apt to be attacked with honey-dew, mildew, rust, and other diseases, which render them unfit for the food of the silkworm. The leaves covered with honey-dew may be washed, and, when thoroughly dry, given to the insects without injury; but the other diseased leaves should be thrown away. If leaves covered with honey-dew are given to silkworms without washing, they cause dysentery and death.

Statistics. The largest white mulberry trees in England are at Syon, where there is one 45 ft. high; diameter of the trunk 1 ft. 10 in., and of the head 59 ft.; and which is covered with fruit every year. At Kenwood is one, 38 years planted, which is 33 ft. high; diameter of the trunk 1 ft. 1 in., and of the head 28 ft. In Hertfordshire, at Cheshunt, 7 years planted, it is 10 ft. high; diameter of the trunk 2 in., and of the head 6 ft. In Oxfordshire, in the Oxford Botanic Garden, 20 years planted, it is 20 ft. high; diameter of the trunk 9 in., and of the head 20 ft. In Suffolk, at Ampton Hall, 9 years planted, it is 9 ft. high; diameter of the trunk 2 in., and of the head 5 ft. In Worcestershire, at Croome, 35 years planted, it is 40 ft. high; diameter of the trunk 12 in., and of the head 40 ft. In Scotland, in Forfarshire, at Airlie Castle, 8 years planted, it is 8 ft. high; in Perthshire, at Kinfauns Castle, 8 years planted, it is 5 ft. high; in Ross-shire, at Brahan Castle, 25 years planted, it is 10 ft. high. In Ireland, at Terenure, near Dublin, 8 years planted, it is 6 ft. high. In France, in the Jardin des Plantes, 35 years planted, it is 32 ft. high, the diameter of the trunk 1 ft., and of the head 36 ft.; in the Botanic Garden, Toulon, 30 years old, it has a trunk 2 ft. 7 in. in circumference. In Saxony, at Wörlitz, 50 years old, it is 40 ft. high, with a trunk 2½ ft. in diameter. In Austria, at Vienna, in the University Botanic Garden, 30 years planted, it is 45 ft. high, the diameter of the trunk 1 ft., and of the head 24 ft.; in Rosenthal's Nursery, 18 years old, it is 30 ft. high, the diameter of the trunk 4 in., and of the head 25 ft.; at Hadersdorf, 30 years old, it is 18 ft. high, diameter of the trunk 10 in., and of the head 2 ft.; at Brick on the Leytha, 27 years planted, it is 30 ft. high; the diameter of the trunk 8 in., and of the head 12 ft. In Prussia, at Berlin, at Sans Souci, 25 years old, it is 9 ft. high; the diameter of the trunk 3 in. In Denmark, at Rosenberg, near Copenhagen, 10 years planted, it is 10 ft. high. In Sweden, at Lund, in the Botanic Garden, it is 18 ft. high, with a trunk 5½ in. in diameter. In Italy, at Monza, 200 years old, it is 40 ft. high, the diameter of the trunk is 3 ft., and of the head 50 ft.

Commercial Statistics. Price of plants, in the London nurseries, from 1s. 6d. to 2s. 6d. each: at Bollwyller, plants three years old, and transplanted, are 10s. per thousand; two years old, 5s. per thousand: at New York, single plants are 37½ cents; and *M. a. multicaulis* is from 25 to 30 dollars per hundred, according to the size of the plants.

The best works on the culture of the white mulberry and the silkworm are, Dandolo's *Dell'Arte di governare i Bacchi da Seta*, Milan; Castelet's *Traité sur le Mûrier blanc*, Paris; Grogner's *Recherches Historiques et Statistiques sur le Mûrier, le Ver à Soie, et la Fabrication de la Soierie*, &c., Lyons; Bonafous's *Mémoire sur une Education de Vers à Soie*, &c., Paris; Kenrick's *American Silk-Grower's Guide*, Boston; Cobb's *Manual of the Mulberry Tree*, &c., Massachusetts; Dr. Pascalis's *Treatise on the Mulberry*, &c., New York; and Murray's *Observations on the Silkworm*, London.

‡ 3. *M. (A.) CONSTANTINOPOLITANA* Poir. The Constantinople Mulberry Tree.

Identification. Poir. Encyc., 4. p. 381.; Spreng. Syst. Vég., 1. p. 492.

Synonymy. *M. byzantina* Sieb.

Engravings. N. Du Ham., 4. t. 24.

Spec. Char., &c. Leaves broadly ovate, heart-shaped at the base, undivided, serrate, 3-nerved; glabrous on both surfaces, except at the axils of the veins on the under one, where they are villous. Male flowers in fascicles. (*Spreng. Syst. Vég.*, i. p. 492.) This is a low branching tree, seldom exceeding the height of 10 ft. or 15 ft.; a native of Turkey, Greece, and Crete; which has been long cultivated in the Jardin des Plantes, but which was not introduced into England till 1818. The fruit is short, thick, and, according to Du Hamel, of a deep red, and insipid taste. The leaves are very good for silkworms. This alleged species is considered as only a variety of *M. alba* by Bosc (*Nov. Cours d'Agric.*, &c.), who says that it is easily recognised by its rough, furrowed, stunted trunk; its thick and short branches; its leaves, which are always entire; and its solitary very white fruit. It is, he adds, a real monster (un véritable monstre, mais qui se propage toujours le même). We have little doubt of its being only a variety of *M. alba*. Du Hamel's description and that of Bosc agree in every particular, except the colour of the fruit. According to M. Madiot, in the *Journal de la Société d'Agriculture Pratique*, *M. a. pamila* (p. 1350.) was obtained from seeds of *M. (a.) constantinopolitana*. Plants of *M. constantinopolitana*, in the Bollwyller Nursery, are 3 francs each; at New York, 50 cents.

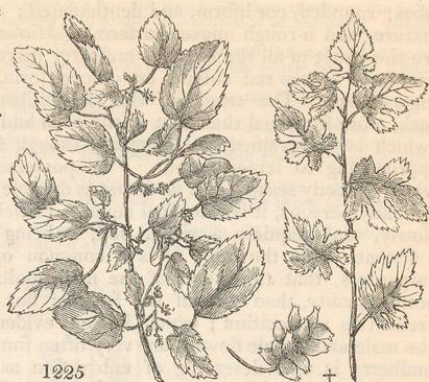
‡ 4. *M. (A.) TATARICA* Pal. The Tartarian Mulberry Tree.

Identification. Pall. Fl. Ross., 2. p. 9. t. 52.; Lin. Sp. Pl., 1399.; Mill. Dict., No. 7.; Willd. Sp. Pl., 4. p. 369.

Engravings. Pall. Fl. Ross., 2. t. 52.; and our fig. 1225.; both sprigs taken from one tree.

Spec. Char., &c. Leaves with a shallow scallop at the base, and either heart-shaped, ovate, or lobed; serrated with equal teeth, smooth; the pro-

jecting portions beside the sinus equal. Very closely akin to *M. álba* L., and, perhaps, originally produced from that species. It inhabits places inundated by the waters of the rivers Wolga and Tanaïs, or Don. (*Willd. Spec. Pl.*, iv. p. 369.) A deciduous tree, growing to the height of 20 ft.; and introduced in 1784. In the *American Silk-Grower's Guide*, it is stated that the fruit is black, and resembles that of *M. nígra*. Gerber, also, says that it is black. "Pallas speaks of it as reddish or pale, of no good



flavour, though it is eaten raw in Tartary, as well as dried, or made into a sweetmeat. A wine is also prepared from it, and a very well-flavoured spirit. This species is reported to be most esteemed for silkworms in China." (*Smith in Rees's Cyclopædia.*) In America, *M. tatárica* is considered to make the finest silk. According to a writer in the *Annales de Fromont*, the *M. tatárica* is, as we have already observed (p. 1349.), nearly related to *M. a. multicaulis*. From the trees, or rather large shrubs, bearing this name in the Kew Garden, we confess our inability to fix on any permanent distinction between them and *M. álba*, as far as the leaves are concerned: the fruit we have never seen. Plants, in the London nurseries, are 2s. 6d. each; at Bollwyller, 1 franc 50 cents; at New York, 75 cents.

‡ 5. *M. RUBRA* L. The red-fruited Mulberry Tree.

Identification. Lin. Sp. Pl., 1399; Mill. Diet., No. 4.; Willd. Arb., 197.; Michx. Fl. Bor. Amer., 2. p. 179.; Pursh Fl. Amer. Sept., 2. p. 639.; Wengenh. Amer., p. 37. t. 15. f. 35.; Nutt. Gen. N. Amer. Pl., Willd. Sp. Pl., 4. p. 369.; N. Du Ham., 4. p. 91.
Synonymes. *M. virginica* Pluk. Alm., p. 253., *Du Ham. Arb.*, 2. p. 24.; *M. pennsylvánica* Nois. Arb. Fruit., Lodd. Cat., edit. 1836.
Engravings. Wengenh. Amer., t. 15. f. 35.; Pluk. Alm., t. 246. f. 4.; and the plate in our last Volume.

Spec. Char., &c. Sexes polygamous. (*Kalm Act. Suec.*, 1776.) Sexes diœcious. (*Gronov. Virg.*, 146.) Spikes of female flowers cylindrical. Catkins [? of male flowers] of the length of those of the common birch (*Bétula álba* L.). Leaves heart-shaped, ovate, acuminate, 3-lobed, or palmate; serrated with equal teeth, rough, somewhat villous; under surface very tomentose, and, in consequence, soft. (*Willd. Sp. Pl.*) A tree, a native of North America, from Canada to Florida; varying in height from 40 ft. to 70 ft. "Cultivated here, according to Parkinson's *Paradisus*, p. 596., early in the seventeenth century. He says, it grows quickly with us to a large tree, and that the fruit is long, red, and pleasantly tasted." (*Smith in Rees's Cyclopædia.*) It flowers in July. This tree is named *M. pennsylvánica* in the Horticultural Society's Garden, and in Loddiges's arboretum. It appears very distinct from any of the preceding sorts, in the spreading umbelliferous appearance of the branches, the flat, heart-shaped, very rough-surfaced leaves, which are almost always entire, but which, nevertheless, are occasionally found as much lobed and cut as those of any other of the genus. This we witnessed in September, 1836, in the specimen tree in the Hackney arboretum.

Description, &c. *M. rubra* attains by far a greater size, as a tree, than any other species of *Morus*. It is seldom found, in a wild state, less than 40 ft. in height; and, in some parts of Pennsylvania and Virginia, it is often 60 ft. or 70 ft. high, or more, and with a trunk 2 ft. and upwards in diameter. The leaves are large, sometimes entire, and sometimes divided into 2 or 3

lobes; rounded, cordiform, and denticulated; of a dark green colour, a thick texture, and a rough uneven surface." (*Michx. Syl. Amer.*, iii. p. 51.) They are the worst of all the kinds of mulberry leaves for feeding silkworms. The fruit is of a deep red colour, an oblong form, and an agreeable, acidulous, sugary taste. The trunk of the red mulberry is covered with a greenish bark, more furrowed than that of the oaks and hickories. The perfect wood (which is fine-grained and compact, though light,) is of a yellowish hue, approaching to lemon colour. "It possesses strength and solidity; and, when perfectly seasoned, it is almost as durable as that of the locust, to which, by many persons, it is esteemed equal." (*Michx.*) It, however, grows more slowly, and requires a richer soil, it being generally found in valleys, at a distance from the sea. It is a common opinion among shipwrights and carpenters, that the wood of the male mulberry is more durable, and of a better quality, than that of the female; but Michaux does not appear to credit this supposition; which, indeed, evidently cannot be depended on, as the male and female flowers are very often found on the same tree. The red mulberry is well deserving of cultivation as an ornamental tree, from its thick and shady foliage; and as a fruit tree, from the agreeable flavour of its fruit. Miller mentions a plant of this species in the garden of Fulham Palace, which, in 1731, had been there for several years without producing any fruit; but which, at some seasons, produced a great number of catkins, much like those of the hazel nut; which occasioned Ray to give it the name of *Corylus*. (*Dict.*, ed. 1.) On enquiring for this tree in 1834, we found nothing known about it. It is generally said that no insect feeds on the mulberry but the silkworm. In Smith and Abbott's work on the insects of Georgia, however, a specimen is given of the red mulberry, with the small ermine moth (*Phalæna punctatissima*) feeding on it. (See *Insects of Georgia*, vol. ii. t. 70.)

♀ *Variety.*

♀ *M. canadensis* Lam. *Diet.*, iv. p. 380., seems to be a variety of *M. rubra*. (*Smith in Rees's Cyclopædia.*)

Statistics. In the environs of London, almost the only plants that we know are those mentioned as in the Horticultural Society's Garden, and in the arboretum of Messrs. Loddiges; the latter being 8 ft. or 10 ft. high, and the former 16 ft. high. In Durham, at Southend, 30 years planted, it is 20 ft. high, against a wall; diameter of trunk 12 in., and of the head 21 ft. not trained. In Oxfordshire, in the Oxford Botanic Garden, 40 years old, it is 12 ft. high against a wall; diameter of the trunk 10 in., and of the head 30 ft. In France, in the Jardin des Plantes, 50 years planted, it is 45 ft. high; the diameter of the trunk 1½ ft., and that of the head 38 ft. In Italy, at Monza, 60 years old, it is 26 ft. high; the diameter of the trunk 2 ft., and of the head 30 ft.

Commercial Statistics. Price of plants, in London, 2s. each; at Bollwyller, francs; at New York, 37½ cents.

♀ 6. *M. (R.) SCABRA* Willd. The rough-leaved Mulberry Tree.

Identification Willd.; Spreng. *Syst. Veget.*, 1. p. 492.; Nutt. *Gen. N. Amer. Pl.*; Lodd. *Cat.*, ed. 1836.

Synonyme. *M. canadensis* Poir.

Spec. Char., &c. Leaves rough on both surfaces, heart-shaped, 5-cleft; the lobes acuminate to the tip, tapered to the base, and serrated with equal teeth. A native of North America. (*Spreng. Syst. Veg.*) A tree, growing to the height of 20 ft. Introduced in 1817; and, from the appearance of the plant bearing this name in the Horticultural Society's Garden (which, in 1836, was 8 ft. high), doubtless only a variety of, or possibly identical with, *M. rubra*.

App. i. *Half-hardy Species of Morus.*

M. indica L. is near *M. álba*; but its leaves are not heart-shaped at the base. (*Willdenow Sp. Pl.*) This name occurs in Mr. Royle's list (see p. 175.). "Rumphius says that the fruit is delicately flavoured, and black when ripe; and that the Chinese feed their silkworms with the leaves. Loureiro mentions the same practice of the inhabitants of Cochinchina, who replant the tree every year, that the foliage may be tender." (*Smith in Rees's Cyclopædia.*)

M. mauritiana Jacq. has the leaves oblong, entire, tapered to both ends, and rough. The leaves of young plants are fiddle-shaped. (*Willdenow Sp. Pl.*) "A large and strong tree. Fruit green, sweet, with some acidity; 1½ in. or 2 in. long. The French call this tree la râpe, or the rasp tree of Ma-

dagascar. The leaves seem calculated to serve as a fine file or rasp, like those of some of the fig kind. It is a most distinct species, and ought to have been named *M. laurifolia* or *M. citrifolia*." (*Smith in Rees's Cyclop.*) This name is also in the list derived from Mr. Royle.

M. latifolia Willd. is a native of the Isle of Bourbon. Its leaves are ovate, heart-shaped at the base, serrate; the disk 4 in. long, 3 in. broad, scabrous, reticulately veined; the petiole 1 in. long. (*Willdenow Sp. Pl.*)

M. australis Willd. is a native of the Isle of Bourbon. It has ovate, serrated, rough leaves; and the styles bearded, even when persistent in the fruit. (*Willd.*)

M. celtidifolia Thunb. is a native of Quito. Its leaves are ovate-oblong, acuminate, undivided, sharply serrated, 3-nerved; roughish above, glabrous beneath. (*Spreng. Syst. Vég.*, i. p. 492.)

M. corylifolia Thunb. is a native of Quito. Its leaves are roundish ovate, acuminate, sharply serrate, 3-nerved, glabrous. (*Spreng.*, l. c.)

M. calcar-galli Cum. is a native of New South Wales, where it is called the yellow wood vine. This "is a shrub which extends itself to a great length, and may eventually prove to belong to the genus *Maclura*."

M. atro-purpurea; *M. parvifolia*; *M. serrata*, syn. *M. heterophylla*; *M. laevigata viridis*; and *M. scandens*; are Nepal kinds, of which very little is known. (See p. 174.)

GENUS II.



BROUSSONETIA Vent. THE BROUSSONETIA. *Lin. Syst. Diœ'cia*
Tetrândria.

Identification. Vent. *Tabl. du Règne Végét.*, 3. p. 547.; *Willd. Sp. Pl.*, 4. p. 743.; *Lindl. Nat. Syst. of Bot.*, p. 178.

Synonymes. *Morus* Seba *Kœmpf.*, *Lin.*; *Papÿrus Encyc. Bot.*, 5. p. 5., *Lam. Ill. Gen.*, t. 762.

Derivation. Named in honour of *P. N. F. Broussonet*, a French naturalist, who wrote numerous works on natural history.

■ 1. *B. PAPIRYFERA* Vent. The paper-bearing *Broussonetia*, or *Paper Mulberry*.

Identification. Vent. *Tabl. du Règne Végét.*, 3. p. 547.; *Willd. Sp. Pl.*, 4. p. 743.

Synonymes. *Morus* 'papyrifera *Lin. Sp. Pl.*, 1399., *Müll. Dict.*, No. 6., *Du Roi Harbk.*, 1. p. 433., *Thunb. Fl. Jap.*, 72.

The Sexes. Both the male and female plants are in the Horticultural Society's Garden, and in the arboretum of Messrs. Loddiges.

Engravings. *Kœmpf. Amœn.*, t. 472.; *Hist. du Japon*, t. 40. f. 1.; *Seba Thesaur.*, 1. t. 28.; *Lam. Ill. Gen.*, t. 762.; *N. Du Ham.*, 2. t. 7.; and the plate in our last Volume.

Variety.

- *B. p. 2 cucullata*; *B. cucullata Bon Jard.*, 1833, p. 919.; *B. spatulata Hort. Brit.*; *B. navicularis Lodd. Cat.*, ed. 1836.—A sport, found on a male plant by M. Camuset, foreman of the nursery, in the Jardin des Plantes; which has its leaves curved upwards, like the hood of a Capuchin, or the sides of a boat. It is propagated by grafting, and may be had in most of the Paris and London nurseries.

Description, &c. A deciduous low tree or large shrub, a native of China and Japan, and of the South Sea Islands; which so closely resembles the mulberry, that it was long considered to belong to that genus, and still retains its English name of the paper mulberry. It was introduced in 1751, and flowers in April, ripening its fruit in the climate of London, in autumn. Its leaves are large, hairy, and canescent; and either heart-shaped, or cut into deep irregular lobes. The fruit is oblong, of a dark scarlet colour when ripe, and of a sweetish, but rather insipid, taste. The tree is perfectly hardy; but, from the extreme brittleness of its wood, it is very liable to be broken by high winds. The wood is soft, spongy, and of no value, except for fire-wood. The leaves are too rough and coarse in their texture for silkworms; but they are found excellent for cattle; and, as the tree will grow rapidly in almost any soil, and throws out numerous tufts of leaves, it might be valuable in some situations and climates, as fodder. The principal use, however, to which the *broussonetia* appears capable of being applied is for the paper that may be made from its bark. The following is an abridgment of *Kœmpfer's* account of the mode of preparing this paper in Japan, as quoted in the *Penny Cyclopædia*, vol. v. p. 472.:—"The branches of the current year, being cut into pieces about a yard long, are boiled till the bark shrinks from the wood, which is taken out and thrown away; and the bark, being dried, is preserved till wanted.

In order to make paper, it is soaked for three or four hours in water; after which the external skin, and the green internal coat, are scraped off, and the strongest and firmest pieces are selected; the produce of the younger shoots being of an inferior quality. If any very old portions present themselves, they are, on the other hand, rejected as too coarse. All knotty parts, and every thing which might impair the beauty of the paper, are also removed. The chosen bark is boiled in a lixivium till its downy fibres can be separated by a touch of the finger. The pulp so produced is then agitated in water till it resembles tufts of tow. If not sufficiently boiled, the paper will be coarse, though strong; if too much, it will be white, indeed, but deficient in strength and solidity. Upon the various degrees and modes of washing the pulp, much also depends as to the quality and beauty of the paper. Mucilage obtained from boiling rice, or from a root called *oreni* (*Kämpf*, 474.), one of the mallow tribe, is afterwards added to the pulp. The paper is finished much after the European mode, except that stalks of rushes are used instead of brass wires." (*Pen. Cyc.*, art. *Broussonétia*) The India or Chinese paper used for taking proofs of engravings is thus made. In Otaheite, the bark of this tree is made into dresses. Plants are readily propagated by layers, suckers, or cuttings of the root.

Statistics. In the environs of London, the largest plant we know of is in the Botanic Garden at Kew, where it is 20 ft. high. In Berkshire, at White Knights, 25 years planted, it is 23 ft. high; the diameter of the trunk 9½ in., and of the head 20 ft. by 13 ft. In Cheshire, at Eaton Hall, 10 years planted, it is 8 ft. high; diameter of the trunk 3 in., and of the head 7 ft. In Oxfordshire, in the Oxford Botanic Garden, 14 years planted, it is 25 ft. high; diameter of the trunk 4 in., and of the head 15 ft. In Worcestershire, at Croome, 40 years old, it is 20 ft. high; diameter of the trunk 12 in. In Scotland, in Perthshire, at Kinfauns Castle, 8 years planted, it is 5 ft. high. In France, at Villers le Bacle, 10 years planted, it is 25 ft. high. In the Botanic Garden, Toulon, 20 years planted, it is 25 ft. high; and the diameter of the trunk is 1 ft. 2 in.; at Nantes, in the nursery of M. De Nèrrières, 30 years planted, it is 25 ft. high; in the Botanic Garden at Avranches, 40 years planted, it is 40 ft. high; the diameter of the trunk 2 ft. 7½ in., and of the head 30 ft. In Austria, at Vienna, in the University Botanic Garden, 20 years planted, it is 22 ft. high; the diameter of the trunk 9 in., and of the head 10 ft.; at Laxenburg, 20 years planted, it is 14 ft. high; the diameter of the trunk 4 in., and of the head 6 ft.; at Hadersdorf, 6 years planted, it is 14 ft. high. In Italy, at Monza, 24 years planted, it is 40 ft. high; the diameter of the trunk 1 ft., and of the head 20 ft.

Commercial Statistics. Plants, in the London nurseries, are from 1s 6d. to 2s. 6d. each; at Bollwyller, 1 franc each; and at New York, the male plant 50 cents each, and the female plant 75 cents.

GENUS III.



MACLURA Nutt. THE MACLURA. *Lin. Syst. Dicæ'cia Tetrándria.*

Identification. Nutt. Gen. N. Amer. Plants, 2, p. 233.; Lindl. Nat. Syst. of Bot., p. 178.

Synonyme. *Tôxylon Rafinesque* in 1817, *Gard. Mag.*, vol. viii. p. 247.

Derivation. Named, by Nuttall, in honour of *William Maclure*, Esq., of the United States; an eminent natural philosopher.

♣ 1. *M. AURANTI'ACA* Nutt. The orange-like-fruited Maclura, or *Osage Orange.*

Identification. Nutt. Gen. N. Amer. Pl., 2, p. 234.

Synonymes. Bow-wood, Yellow Wood, *N. Amer.*

The Sexes. Both male and female plants are in the Horticultural Society's Garden, and in the Hackney arboretum.

Engravings. Appendix to Lambert's Monog. on the Genus *Pinus*, 2, p. 32.; and our *fig.* 1226., in which *a* is the female flower, and *b* the male.

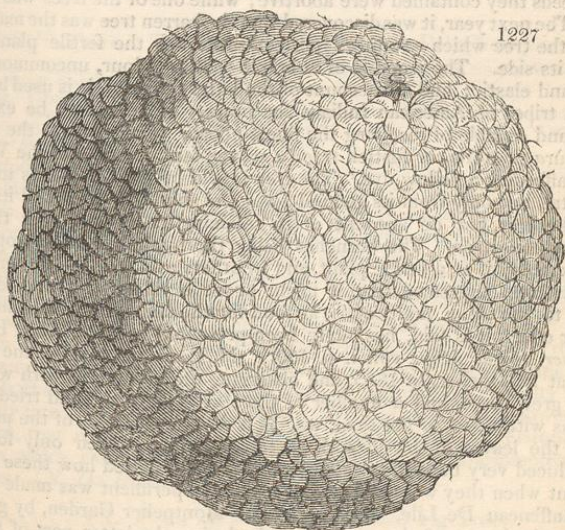
Description, &c. The maclura is a deciduous widely spreading tree, with spiny branches, growing to the height of about 30 ft., on the banks of the Red River; or, according to Nuttall, of 60 ft., in the Arkansas. The leaves are ovate acuminate, of a bright shining green, broad, with a cuspidate point, 3 in. or 3½ in. long, and about 2 in. broad. The petiole is often 1 in. long. The spines are simple, rather strong, about 1 in. in length, and produced in the axils of the leaves. The flowers are inconspicuous, and nearly green, with a slight tinge of yellow. The fruit, which in size and general appearance, at a distance, resembles a large Seville orange, consists of radiating, somewhat

woody fibres, terminating in a tuberculated surface, and contains numerous seeds (or nuts, as they are botanically termed), and a considerable quantity of sweetish milky fluid, which, when exposed to the action of the air, coagulates like milk. The sap of the young wood and leaves is also milky, and soon dries on exposure to the air. It is insoluble in water, and contains a large proportion of caoutchouc. This tree is found on the banks of the Red River, and in deep and fertile soil in the adjacent valley. The Arkansa appears to form its northern boundary. It was first introduced into the gardens of St. Louis, on the Mississippi, from a village of the Osage Indians; whence it obtained its popular name of the Osage orange. It was afterwards planted in the nursery of Mr. M'Mahon at Philadelphia, whose widow now carries on the business, and still possesses the original tree. About 1818, seeds were sent to England by M. Correa de Serra (See *Gard. Mag.*, i. p. 356.); and, subsequently, plants of both sexes were imported by the London nurserymen.



1226

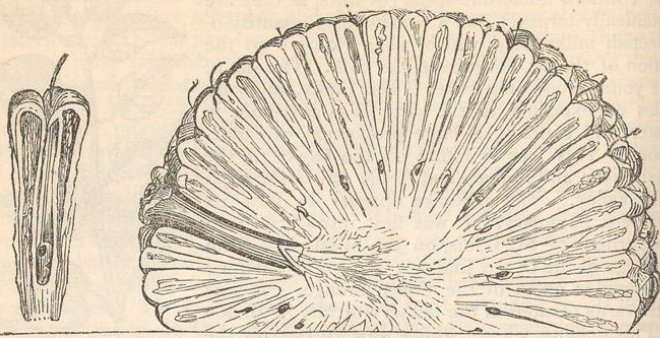
Properties and Uses. The fruit, when ripe, is of a golden colour, and on the tree has a splendid appearance; but, though eatable, it does not appear to be any where used for human food. M. Le Roy, nurseryman at Angers, informed us, in June, 1836, that he had tasted some of the fruit which had ripened at Lyons; and that it was scarcely so good as that of the *Arbutus U'nedo*. Fruit has also been ripened at Clairvaux, near Chatellerault (*Recueil Indust.*, 2d ser., tom. ii. 1836, p. 50.); and at Montpelier. (See *Allgemeine Garten-Zeitung*, Nos. 36. and 37., for September, 1836.) An Osage orange sent to us by Dr. Mease of Philadelphia, from Mrs. M'Mahon's Nursery, in Jan. 1830, (of which *fig.* 1227. is a view, and *fig.* 1228. a section; both of the natural



1227

size;) measured 9 in. round one way, and 9¼ in. the other. It weighed 15 oz. when gathered. The colour was of a greenish yellow, and the taste insipid,

1228



but slightly acid. It did not appear half ripe when we received it; and it decayed without coming to maturity. We have since, at different times, received two other fruits, also from Dr. Mease; but perceived no difference between them and the one figured above. The seeds in the fruit last received appearing full, we distributed them; and young plants have been raised from them by M. Vilmorin of Paris; Mr. Gordon of the London Horticultural Society's arboretum; Mr. Campbell of the Botanic Garden, Manchester; and others. Mr. R. Buist, in the *American Gardener's Magazine*, vol. ii. p. 77., states that there are four trees in Mrs. McMahon's Nursery, Philadelphia, which were among the first introduced into that part of America. They are planted two and two, each pair being about 400 ft. apart. In 1831, it was discovered that one of these trees produced larger fruit than the others, and that this fruit contained perfect seeds. Two of the other trees produced smaller fruit, but the seeds they contained were abortive; while one of the trees was entirely barren. The next year, it was discovered that the barren tree was the male plant; and that the tree which produced perfect seeds was the fertile plant, which stood by its side. The wood is of a bright yellow colour, uncommonly fine-grained, and elastic; and, on account of the latter property, it is used by all the southern tribes of American Indians for bows. It is said to be extremely durable, and capable of receiving the finest polish. It resembles the wood of the *Maclura tinctoria*, or fustick tree (a stove plant, a native of the West Indies), in affording a yellow dye. The tree is said by the Americans to be very ornamental, not only from its general form, its shining foliage, and its golden orange-like fruit, but on account of its retaining its leaves longer than any other deciduous tree. The branches being thorny, it has been proposed by some to employ it as a hedge plant, and by others as a stock to the mulberry; and it has been suggested that it might prove a valuable substitute for, or auxiliary to, the *M. a. multicaulis*, as food for the silkworm. A memorial to the latter effect, it is said, has lately been presented to the French Institute. (See *Amer. Gard. Mag.*, vol. i. p. 400.) M. Bonafous, visiting the Botanic Garden at Montpellier, in 1835, and observing the luxuriance with which the maclura grew there, had a number of the leaves gathered, and tried to feed silkworms with them, in the same way as is done with those of the mulberry. He gave the leaves of the maclura to 18 silkworms, as their only food, and they produced very beautiful cocoons; but it is not stated how these cocoons turned out when they were reeled. A second experiment was made in 1836, by M. Raffeneau De Lile, director of the Montpellier Garden, by giving 50 silkworms the leaves of the maclura only during the latter part of their existence. The worms were not fed on the maclura till the 19th of May, when they cast their second skins. These worms never seemed to eat the leaves greedily; but they increased in size as much as those that were fed on the

leaves of the mulberry. In the course of feeding, 15 silkworms wandered away or died; and, during the time of spinning, 20 more died, the latter becoming black, rotten, and reduced to a liquid. The cocoons were not ready till some days after those of the worms fed on mulberry leaves: only 5 of them were quite perfect, but several others were tolerably so; and from all these the silk was reeled easily, and was of excellent quality. Other experiments have been tried in Italy, but with still less favourable results. (*Otto's Garten Zeitung*, vol. iii. p. 292.) The tree is perfectly hardy about Philadelphia, and also in the climate of London; where, when cut down after having been two or three years established, it throws up shoots 6 ft. or 8 ft. in length, and nearly $\frac{1}{2}$ in. in diameter, with fine, broad, shining, succulent leaves. Hitherto it has had no proper trial as a standard in England, having been originally considered tender, and planted against a wall; but we have no doubt it will, in time, become a valuable timber tree of the second rank. It is propagated with the greatest ease by cuttings of the roots, or by layers; and it will grow in any common soil.

Statistics. In the environs of London, the largest plant, as a standard, is a female tree in the Hamersmith Nursery, which is nearly 16 ft. high. In our garden at Bayswater, a female plant, against a wall, is about the same height. At Kew, one against a wall is 12 ft. high. In Staffordshire, at Blithfield, in 1834, it was 6 ft. high against a wall. In France, in the Jardin des Plantes, 10 years planted, it is 18 ft. high; in the nursery of M. Sidy, at Lyons, where it has fruited, it is 25 ft. high; at Villers la Bacle, 8 years planted, it is 15 ft. high; in the Botanic Garden at Toulon, 5 years planted, it is 12 ft. high. In Austria, at Brück on the Leytha, 10 years planted, it is 6 ft. high. In Italy, at Monza, the female tree, 6 years planted, was, in 1835, 16 ft. high, and fruited for the first time. In North America, at Philadelphia, the four largest trees are those mentioned as in Mrs. M'Mahon's Nursery; and there are also large trees in Landreth's Nursery, which, in 1831, "were full of fruit." In Virginia, at Beaverdam, a female tree, with a globular head, yielded, in 1835, 150 fruit, many of which weighed 18 oz. or 19 oz. each. (*Amer. Gard. Mag.*, 2. p. 9.)

Commercial Statistics. Plants, in the London nurseries, are 2s. each; at New York, female plants are 1 dollar, and male plants 2 dollars, each.

GENUS IV.

FIGUS Tourn. THE FIG TREE. *Lin. Syst.* Polygàmia Dic'cica.

Identification. Tourn.; T. Nees ab Esenbeck *Gen. Pl. Fl. Germ.*, fasc. 3. No. 6.; Willd. *Sp. Pl.*, 4. p. 131.; Lindl. *Nat. Syst. of Bot.*, p. 178.

Synonymes. Figuier, *Fr.*; Feigenbaum, *Ger.*

Derivation. Some derive *Ficus* from *facinus*, on account of its abundant bearing; and others from *sukos* (Greek), or *fig* (Hebrew), the names for the fig tree in those languages. The fig tree has nearly the same name in all the European languages.

Description, &c. The species are all trees, natives of warm climates, and remarkable, in a popular point of view, for having their flowers concealed by the fleshy receptacle known as the fruit. The sycamore of Scripture (*Ficus Sycómorus L.*) is a species of fig, a native of Egypt, where it is a timber tree exceeding the middle size, and bearing edible fruit. A large tree of this species is figured in the *Picture Bible*, vol. ii. p. 181. The only species which will endure the open air in Britain is the *F. Cárica*, or common garden fig. These two species are the only ones which produce eatable fruit. It is mentioned in the *Nouveau Du Hamel*, that the receptacle which forms the fruit of the fig is not always entire and connivent; but that there are some few sorts in which the fruit constantly opens when it approaches maturity; dividing ordinarily into four parts, which expand like the petals of a flower, to such an extent, that each division becomes perpendicular to the peduncle. The varieties which exhibit this singularity are called the Barnissotes and the Verdales. (*N. Du Ham.*, tom. iv. p. 198., note.)

† 1. *F. CA'RICA L.* The common Fig Tree.

Identification. *Lin. Sp.*, 1513.; *Willd. Sp.*, 4. p. 131.; *Lam. Dict.*, 2.; *Mill. Ic.*, t. 73. p. 489.; *N. D. Ham.*, 4. p. 198.

Synonymes. *F. communis Bauh. Pin.*, 457.; *F. hémilis* and *F. sylvéstris Tourn. Inst.*, 663.; *Figuier commun, Fr.*; Gemeine Feigenbaum, *Ger.*

Engravings. Mill. Ic., t. 73.; Lam. Ill., t. 861.; N. Du Ham., t. 58.; and the plate of this tree in our last Volume.

Spec. Char., &c. Leaves palmate and subtrilobate; rough above, pubescent beneath. (*Willd.*) A low deciduous tree, a native of the East, cultivated in Britain from time immemorial; and ripening its fruit against walls, in the climate of London, in the month of September.

Varieties. Botanically, the common fig may be considered as existing in three different states:—1. Wild, in which the leaves are comparatively small, and not much cut; and the fruit small, and sometimes blue and sometimes white. 2. Cultivated, with very large leaves, very deeply cut, such as the blue Ischia and the Brunswick fig, and other sorts; the fruit of some of which is white, and of others dark. 3. Cultivated, with very large leaves, not much cut, as the white Marseilles fig, and others with fruit of different colours. Those who are disposed to go farther may form three subvarieties under each of these heads, according as the fruit is blue or black, red or purple, or yellow, white, or green.

Garden Varieties. These are very numerous. In the *Nouveau Du Hamel*, a selection of 36 choice sorts is given, and several of them figured. In the Horticultural Society's *Fruit Catalogue* for 1831, 89 sorts are enumerated, independently of synonyms. In the *Encyc. of Gard.*, ed. 1835, a selection of 22 sorts is given for a large garden; and also selections for smaller gardens. For an arboretum in the climate of London, and to be treated as standards, we would recommend the wild fig (which has the leaves generally entire, and of which there is a standard tree in the Twickenham Botanic Garden), the white Marseilles, the Brunswick, and the small brown Ischia. The latter will, in very fine seasons, and in warm situations in the climate of London, ripen a few fruit on a standard in the open air.

Description, &c. The common fig is a low, deciduous tree, rarely exceeding 20 ft. in height as a standard, even in the south of Europe; with large deeply lobed leaves, rough on the upper surface, and pubescent beneath. The branches are clothed with short hairs, and the bark of the trunk is greenish. The fig is a native of the west of Asia and the shores of the Mediterranean, both in Europe and Africa. In no country is it found in elevated situations, or at a distance from the sea. Hence its abundance in the islands of the Archipelago, and on the shores of the adjoining continents. It has been cultivated from time immemorial; and, indeed, the fig was said to have been the first fruit eaten by man. In the *Bible*, we read frequently of the fig tree, both in the Old and New Testament. Among the Greeks, we find, by the laws of Lycurgus, that figs formed a part of the ordinary food of the Spartans. The Athenians were so choice of their figs, that they did not allow them to be exported; and the informers against those who broke this law, being called *sukophantai*, from two Greek words, signifying the discoverers of figs, gave rise to our modern word *sycophant*. The fig tree under which Romulus and Remus were suckled, and the basket of figs in which the asp was conveyed to Cleopatra, are examples familiar to every one of the frequency of the allusions to this tree in ancient history. At Rome, the fig was carried next to the vine in the processions of Bacchus, who was supposed to have derived his copulency and vigour from this fruit, and not from the grape. Pliny, also, recommends figs as being nutritive and restorative; and it appears from him, and other ancient writers, that they were given to professed champions and wrestlers, to refresh and strengthen them. Pliny mentions six different kinds of fig, enumerating the peculiar qualities of each.

The first fig trees planted in England are said to have been brought from Italy in 1548, in the reign of Henry VIII., by Cardinal Pole, and placed by him against the walls of the archiepiscopal palace at Lambeth. In Miller's time, these two trees covered a surface of 50 ft. in height, and 40 ft. in breadth; and the diameter of the trunk of one tree was $9\frac{1}{2}$ in., and of the other $7\frac{1}{2}$ in. These trees were much injured by the severe winter of 1813-14; but the main stems being cut down, they recovered, so as in 1817 to be in tolerable

vigour, when Dr. Neill, and the other members of the deputation of the Caledonian Horticultural Society, inspected the archiepiscopal gardens. On our visiting the grounds, however, in September, 1836, we found that the trees had been destroyed some years before, when the palace was undergoing repair; and that the only traces left of them were some young plants raised from cuttings, which are now growing in the archbishop's kitchen-garden. At Mitcham, in the garden of the Manor House, formerly the private estate of Archbishop Cranmer, there was, in Miller's time, the remains of a white fig tree, confidently asserted to have been planted by Cranmer himself; but it was destroyed in 1790. Its stem, some years before, was 10 in. in diameter; but its branches were very low and weak. In the Dean's garden at Winchester, there existed, in 1757, a fig tree protected by a wooden frame, supposed to be of very great age. On the stone wall to which it was trained there were several inscriptions, one of which bore testimony that, in 1623, James I. "tasted of the fruit of this tree with great pleasure." Miller says that it was suffered to perish for want of necessary repairs to the framework. A fig tree brought from Aleppo by Dr. Pococke, and which was planted by him, in 1648, in the garden of the regius professor of Hebrew in Christ-Church, Oxford, seems to be the only ancient fig tree on record still existing in Britain. Some of the figs produced by this tree were exhibited at a meeting of the London Horticultural Society, in August, 1819; and others gained a prize, as the best white figs, at a meeting of the Oxford and Oxfordshire Horticultural Society, in August, 1833. An account of this tree, by Mr. Baxter, curator of the Oxford Botanic Garden, will be found in the London Horticultural Society's *Transactions*, vol. iii. p. 433.; from which it appears that, in 1806, Dr. White, then professor of Hebrew in Christ-Church, caused an engraving to be made of the tree. It was at that time 21 ft. high, and the trunk measured 3 ft. 6 in. in circumference at its upper part. The tree, when we saw it in 1833, contained but very slight remains of the old trunk; but it had thrown out a number of branches, perhaps at that time of 20 or 30 years' growth, and some of which were upwards of 25 ft. in length. (See *Gard. Mag.*, vol. x. p. 105.) The fig tree, though introduced so early, appears for a long time not to have been extensively cultivated in England. Professor Burnet thinks that this was owing to a popular prejudice, the fig having been once a common vehicle for poison: a singular contrast to the ideas expressed in the *Bible* respecting this fruit; the best blessing of heaven being typified by every man sitting under his own fig tree. In France, the culture of the fig tree was not carried to any degree of perfection till the time of Olivier De Serres; but it is now general throughout the whole country. In the south of France, figs are grown for drying as an article of commerce, but in the northern provinces they are only used for the table. In the East, as well as in Italy and Spain, figs form a principal article of sustenance for the population, and a considerable article of commerce. According to M'Culloch, the importation into Britain is about 20,000 cwt., notwithstanding that every cwt. pays a duty of 21s., which exceeds 100 per cent upon the price of the figs in bond. If this duty were reduced, he says, to 8s. or 10s. the cwt., it may very fairly be concluded that the quantity imported would very soon be trebled, or more.

In Britain, the fig is in general cultivation in first-rate gardens; usually against walls; but in some parts of the southern counties, as along the coast of Sussex, and in Devonshire, &c., as standards. In Scotland, it is never seen as a standard; but it ripens its fruit against a south wall, without the aid of fire heat, in some parts of East Lothian, and in Wigtonshire; and against a flued wall, even in the neighbourhood of Glasgow. The largest fig tree against a wall which we have seen in England is at Farnham Castle, where, in 25 years, it has reached the height of 40 ft. against the walls of the castle. The largest standard fig trees that we have seen are at Arundel Castle, where they are upwards of 25 ft. high, with trunks 1 ft. in diameter. At Tarring, and at one or two other places near Brighton, fig trees are grown as standards,

and produce abundant crops; though the fruit is inferior in flavour to that ripened against walls, except in very fine seasons.

Properties and Uses. The fig is cultivated almost entirely for its fruit. Its wood, which is extremely light and tender, is used, in France, for making whetstones, from its facility in receiving and retaining the emery and the oil that are employed to sharpen smiths' tools. The soft wood is white, and the heart-wood yellow. It loses a great deal in weight by drying; but it acquires by that process so much strength and elasticity, that the screws of wine-presses are made of it. When used as fuel, it does not give a very intense heat; but its charcoal has the valuable property of consuming very slowly. The fruit is esteemed demulcent and laxative; and it has been long used in domestic medicine as a poultice. King Hezekiah's boil was cured by a lump or poultice of figs, applied according to the directions of Isaiah, and which, Professor Burnet observes, is the first poultice that we read of in history. In the Canaries, in Portugal, and in the Greek Archipelago, a kind of brandy is distilled from fermented figs. The leaves and bark of the fig tree abound in a milky acrid juice, which may be used as rennet, for raising blisters, and for destroying warts. This milky juice containing caoutchouc, Indian rubber might consequently be made from the common fig tree in England, if it were thought desirable; and, on account of the same property, the very tenderest of the young leaves might be given to the larva of the silkworm. All the species of the genus *Ficus*, and also of the allied genus *Cárica*, are said to have the singular property of rendering raw meat tender when hung beneath their shade. On what chemical principle this is to be accounted for, we are ignorant, but the fact seems undoubted. As a fruit tree, the fig is valuable for thriving and ripening fruit in situations not favourable in regard to light, air, or soil; such as against walls in court-yards, against the walls of houses in crowded cities, on the back-walls of green-houses and forcing-houses, comparatively in the shade, &c. It also bears better than any other fruit tree whatever, in pots; and, with abundance of liquid manure and heat, will produce, in a stove, three, and sometimes even four, crops in the course of a year.

Culture and Management of the Fig in Countries where it is grown as an Article of Commerce. In France, more particularly about Marseilles, when a fig plantation is to be formed, an open situation is made choice of near the sea, and exposed to the south and the east. The ground is trenched 2 ft. or 3 ft. deep, and richly manured; and the trees are planted in squares, or in quincunx, at from 12 ft. to 15 ft. distance from each other. The plants are watered frequently during the first summer, and left without any pruning whatever; but in the winter of the second year they are cut down to the ground. The third year, they throw up vigorous shoots, five or six of which are retained to form a bush; and in the following, or fourth, year the tree is suffered to ripen fruit. In some cases, the trees are trained to single stems; and this is generally the case in Italy and Greece, where the climate is milder, and the tree attains a larger size than in France. In the future management of the trees, they require very little pruning, except when they get too much crowded with branches. They seldom suffer from insects; but always more or less, during very hot summers, from the want of water, which they require in abundance, on account of the excessive transpiration which takes place from their large leaves and very porous bark, which has but a very slight epidermis. Hence, in seasons of very great drought, the branches are sometimes completely burnt up. Severe frost has the same effect on the branches in winter, even at Marseilles, as extreme drought has in summer. In the south of France, and in all countries which may properly be called fig climates, two crops are produced in a year: the first is from the old wood, and corresponds with our crops in England; and the second from the wood of the current year, the figs produced by which, in this country, are never ripened except in hot-houses. In Greece and Egypt a third crop is sometimes produced. The first crop is ripened, in the south of France and in Italy, in May; and the second crop in September. Those which are to be dried are left on the tree till they are

dead ripe, which is known by a drop of sweet liquid which appears hanging from the eye. The figs, being gathered, are placed on wicker hurdles, in a dry airy shed; and, when the dew is off, every morning they are exposed to the sun during the hottest part of the day. To facilitate the progress of drying, the figs are occasionally flattened with the hand; and, in moist dull weather, they are placed in rooms warmed by stoves. When thoroughly dried, they are packed in rush baskets, or in boxes, in layers, alternately with long straw and laurel leaves, and in this state they are sold to the merchants. In some parts of the south of France, figs are prepared by dipping them in hot lye made from the ashes of the fig tree, and then dried; the use of lye being to harden their skins. The white figs are preferred for the market, the violet kind being retained in the country for the use of the inhabitants; and forming in Greece, with barley bread, their principal food for a great part of the year. Fowls are remarkably fond of figs; and, where they are abundant, as in the department of the Var in France, and in the islands of the Archipelago, they are given to horses, mules, and oxen, with a view to strengthen and bring them into good condition, or to fatten them.

Culture and Management of the Fig in the North of France. Except in the gardens of private persons, where the fig is generally trained against walls, as in England, there are only two or three places where it is grown for its fruit as a standard; and the principal of these is at Argenteuil, in the neighbourhood of Paris. We visited the fig gardens there in 1828; and an account of them, at length, will be found in the *Gardener's Magazine*, vol. vii. p. 262. The fig trees are kept as low bushes, and the shoots are never allowed to attain more than three or four years' growth; because it is necessary to bend them down to the ground, and retain them there, by means of stakes, or stones, or a mass of soil, to protect them from the drying effects of the frost. It is observed in the *Nouveau Cours d'Agriculture*, that the figs at Argenteuil are never brought to such a degree of perfection as to please the palates of those who have been accustomed to the figs of Marseilles. They are, says the writer, always either insipid or half rotten; and, even to bring them to this state, it is necessary to pinch off the points of the shoots, in the same way as is done with the vine when early grapes are wanted; or with the pea, to accelerate the maturity of the pods. An additional process is requisite in cold seasons, and at the latter end of every season; and that is, the inserting of a small drop of oil, by means of a straw, into the eye of the fruit; which has the effect of destroying the vital principle, and causing the fig to part readily from the shoot, like ripe fruit; after which it soon begins to decay.

Caprification. This process, which we shall hereafter describe, and which has been in use for an unknown length of time in the Levant, was first mentioned by Tournefort; and, though it is laughed at by many of the French physiologists of the present day, we cannot help thinking that it must be of some important use. It is alleged by Bosc that it has no other object than that of hastening the maturity of the crop; but others are of opinion that, by insuring the fecundation of the stigma, it tends to increase the size of the fruit, and, by filling it with mature seeds, to render it more nourishing. Olivier, the botanical traveller, asserts that, after a long residence in the islands of the Archipelago, he is convinced of the inutility of the practice; and Bosc, though he allows that it may hasten the maturity of the figs, as the larva of the pyrale pommonelle hastens the maturity of the apple in France, yet believes that it has no effect in improving either the size or the flavour of the fruit. M. Bernard, the author of a *Memoire sur le Figuier*, and of the article on that tree in the *Nouveau Du Hamel*, goes farther, and asserts that the figs which have undergone the process of caprification are inferior to others in size, flavour, and the property of keeping. In Egypt, where the sycamore fig is the prevailing species, an operation is performed on the fruit, which is said to answer the purpose of caprification, as far as respects early ripening. When the fruit is a third part of its size, a slice is cut off the end of it, of a sufficient depth to remove all the stamens, which have not by this time matured their fertilising dust. The wound is

immediately covered with sap, which thickens, and forms a mass that excludes the air from the interior of the fruit; and the consequence is, that it ripens, or becomes ready to drop off, in half the time usually taken by nature, without losing any of its size or of its flavour. This process, Bosc observes, deserves a trial in France.

The Process of Caprification is described by Tournefort; and his description differs very little from that given by Pliny. It consists in inducing a certain species of insect of the gnat kind, which abounds on the wild fig, to enter the fruit of the cultivated fig, for the purpose of fecundating the fertile flowers in the interior of the fruit by the farina of the barren ones near its orifice. The details will be found given at length in Rees's *Cyclopædia*; under the word *Caprification* in Martyn's *Miller*; and in the *Encyclopædia of Geography*.

Propagation and Culture. The fig is easily propagated by cuttings of the shoots or roots, not one of which will fail; and also by suckers, layers, and seeds. In British nurseries, it is generally propagated by layers; though these do not ripen their wood, the first season, so well as cuttings. When the fig is to be planted as a standard tree, constant attention must be paid to remove all suckers from its collar, and all side shoots from its stem. When trained against a wall in a cold climate, the branches should proceed from a single stem, and not from the collar, as is generally the case; because the plant, when so treated, produces shoots which are less vigorous, and, consequently, more likely to ripen their wood.

Insects, Accidents, and Diseases. The fig, in hot countries, and in dry seasons, especially when at a distance from the sea, is apt to have its leaves and fruit scorched and shriveled up by the sun. It is scarcely subject to any diseases; but it is liable to the attacks of the cochineal, the kermes, and psylla. In British gardens, it is very seldom injured by insects in the open air; but it is very liable to the attacks of the red spider, the coccus, and the honey-dew, under glass. Abundance of water, and a moist atmosphere, like that of its indigenous habitat, the sea shore, are perhaps the best preventives.

Statistics. The largest standard fig trees that we know of in the neighbourhood of London are at Syon, Chiswick, and in the Mile End Nursery, where they are about 15 ft. high. In Sussex, at Arundel Castle, there are several standard trees in the old garden, 25 ft. high; at Tarring, near Worthing, in the largest fig garden, there are 70 standard trees, from 12 ft. to 15 ft. high. At Blackdown House, near Haslemere, there are some fine old standard fig trees, which ripen fruit every year. In France, in the neighbourhood of Nantes, the tree, as a standard, seldom exceeds 18 ft. in height; at Avignon it attains the height of 20 ft. or 25 ft.; and, in 1819, we observed some very fine specimens in the garden of the Military Hospital there. In Italy, at Monza, a tree, 60 years old, is 30 ft. high; the diameter of the trunk $1\frac{1}{2}$ ft., and of the head 60 ft. Plants, in the London nurseries, are from 15. 6d. to 5s. each, according to the variety; at Bollwyller, 2 francs each; and at New York, from 50 cents to 1 dollar.

GENUS V.



BO'RYA W. THE BORYA. *Lin. Syst. Dicc'cia Di-Triándria.*

Identification. Willd. Sp. Pl., 4. p. 711.; Ait. Hort. Kew., ed. 2., vol. 5.; Lindl. Nat. Syst. of Bot., p. 178.

Synonymes. Adèlia Michx. *Fl. Bor. Amer.*, 2. p. 223.; Bigelovia Smith in Rees's *Cyclop.*, Addenda. *Derivation.* Named in honour of Bory de St. Vincent who visited the Mauritius and the Isle of Bourbon, to examine their botany. Smith, in Rees's *Cyclopædia*, objects to the name of Borya being applied to this genus, because La Billardière had previously given the same name to another genus; and he suggests the substitution of the name of Bigelovia, in commemoration of Dr. Bigelow of Boston, author of the *Florula Bostoniensis*, and of the *American Medical Botany*. The genus Borya Lab., and the genus Borya Willd., are both cited in Lindl. *Natural System of Botany*, and it is most probable that another name will be instituted for one of them.

Description, &c. Deciduous shrubs, growing to the height of from 6 ft. to 12 ft. in common garden soil, with a dark brown or purple bark, and small, deep green, opposite leaves. Propagated by cuttings, and quite hardy.

‡ 1. B. LIGU'STRINA Willd. The Privet-like Borya.

Identification. Willd. Sp. Pl., 4. p. 711.; Ait. Hort. Kew., ed. 2., vol. 5.

Synonymes. Adèlia ligustrina Michx. *Fl. Bor. Amer.*, 2. p. 224.; Bigelovia ligustrina Smith in Rees's *Cyclop.* Addenda, Lodd. *Cat.*, ed. 1836.

The Seeds. The plants bearing this name in Loddiges's arboretum have not yet flowered.

Spec. Char., &c. In habit and leaves, somewhat resembling the common privet (*Ligústrum vulgare L.*). Leaves with very short petioles, and disks that are lanceolate-oblong, entire, somewhat membranous. Fruit rather shortly ovate. (*Michx. Fl. Bor. Amer.*) A native of North America, in thickets about rivers, in the countries of the Illinois, Tennessee, &c.; flowering in July and August. (*Smith.*) Introduced into England in 1812, by Lyon; and there are plants in the arboretum of Messrs. Loddiges, where it grows freely in common garden soil, forming a shrub, apparently a fit associate for *Ligústrum*, *Fontanèsia*, and *Prinos*.

❖ 2. *B. (? L.) ACUMINATA Willd.* The acuminate-leaved Borya.

Identification. Willd. Sp. Pl., 4. p. 711.; Ait. Hort. Kew., ed. 2., vol. 5. *Synonymes.* *Adèlia acuminata Michx. Fl. Bor. Amer.*, 2. p. 225. t. 48.; *Bigelovia acuminata Smith in Rees's Cyclop. Addenda, Lodd. Cat.*, ed. 1836.

The Sczes. Uncertain which is in England. *Engravings.* Michx. Fl. Bor. Amer., 2. t. 28.; and our fig. 1229.

Spec. Char., &c. Leaves membranous, lanceolate in almost a rhombic manner; but most tapered to the outward end; $1\frac{1}{2}$ in. long, serrulate.—Male flowers several together in small sessile tufts, encompassed with several ovate bracteas.—Female flowers stalked, very small. Fruit pendulous, elliptic-oblong, nearly 1 in. long before it is ripe, tapered to the tip in a beak-like manner.—It appears that the taper lateral branches form something like thorns. (*Michx. and Smith.*) Indigenous to the banks of rivers in Carolina and Georgia. Introduced into England in 1812; but the plants in the arboretum of Messrs. Loddiges have not yet flowered. The only difference which we can observe between *B. acuminata* and *B. ligústrina* is, that the former has the leaves of a paler green.



❖ 3. *B. (L.) PORULOSA Willd.* The pore-like-dotted-leaved Borya.

Identification. Willd. Sp. Pl., 4. p. 711.; Ait. Hort. Kew., ed. 2., vol. 5. *Synonymes.* *Adèlia porulosa Michx. Fl. Bor. Amer.*, 2. p. 224.; *Bigelovia porulosa Smith in Rees's Cyclop. Addenda*; ? *B. ovata Lodd. Cat.*, ed. 1836. *The Sczes.* Uncertain which is in England.

Spec. Char., &c. Leaves coriaceous, sessile, lanceolately ovate, but with a blunt point, entire; the lateral edges revolute; under surface rather rusty, and punctured with little holes. (*Michx. Fl. Bor. Amer.*) It is indigenous to the coasts of Georgia and Florida. Introduced into England in 1806. The plants in the collection of Messrs. Loddiges differ from *B. ligústrina*, chiefly in the leaves being shorter.

❖ 4. *B. DISTICHOPHYLLA Nutt.* The two-rowed-leaved Borya.

Identification. Nutt. Gen. N. Amer. Pl., 2. p. 232.

Spec. Char., &c. A shrub, 12 ft. to 16 ft. high. Leaves in two rows, subsessile, lanceolate, acute, entire rough at the edge, membranous. Branchlets very slender. Scales of the bud pungently acute, [?] "confuent in the leaves." Indigenous to the banks of French Broad River, East Tennessee. (*Nuttall*, who had seen it alive.) Mr. George Don thinks that this plant has been introduced; but we have never seen it.

CHAP. CI.

OF THE HARDY LIGNEOUS PLANTS OF THE ORDER ULMA'CEÆ.

THEY are included in three genera, which have the following names and characters:—

U'LMUS L. Flowers, in most species, protruded earlier than the shoots and leaves of the year; disposed in groups, each group lateral, and proceeding