

PART VI.

Price 2 Rs.

THE

FLORA SYLVATICA:

Being Figures and Descriptions of the Timber Trees

OF THE

MADRAS PRESIDENCY.

BY

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OFFICIATING CONSERVATOR OF FORESTS.

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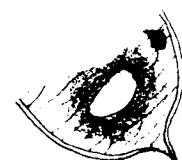
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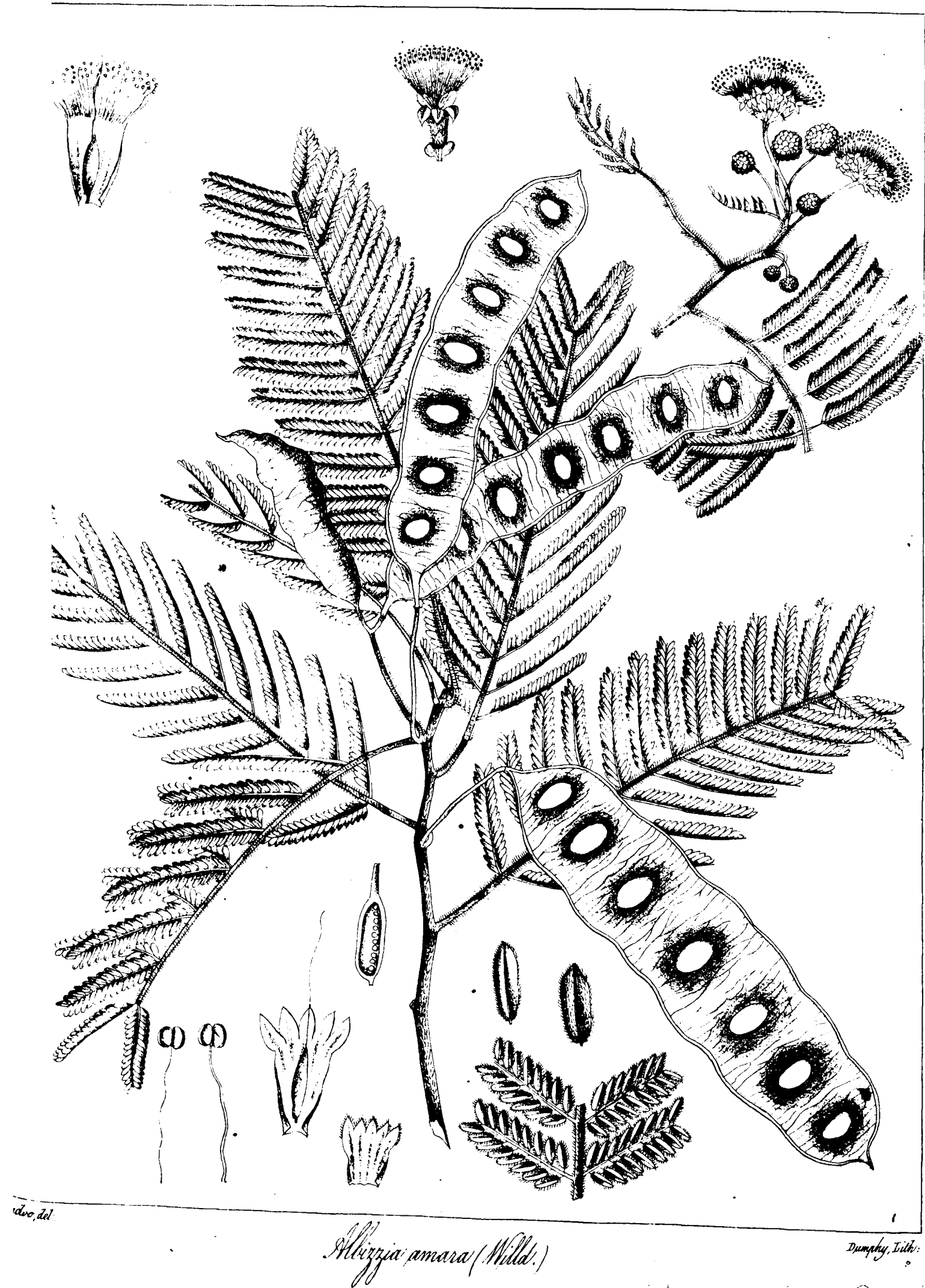


ALBIZZIA AMARA. (Nat. order Leguminosæ; Sub-order Mimosæ.)

For Gen. Char. see under "A. Lebbek."

ALBIZZIA AMARA. (Willd.) A tree, unarmed; branches terete, young shoots petioles peduncles and under side of the leaflets clothed with yellowish tomentum; leaves bipinnate, pinnae 8-10 pair with a gland on the petiole and between the last pair, leaflets 20-30 pair, when old somewhat glabrous, stipules lanceolate, peduncles solitary or aggregated long and filiform in the axils of the upper leaves and racemose from the abortion of the leaves; flowers small in globular heads, corol 5 cleft, stamens long numerous monodelphous; legumes flat thin broadly linear 3-6 seeded. *Acacia amara*, Willd. Sp. 4, p. 1074;—*W. A. Prod.* p. 274. *Mimosa amara*, Rozb. Fl. Ind. ii, 548.

A tolerably large tree but of low stature, very abundant throughout the Madras Presidency, Mysore and Bombay, and also inhabits the north of Ceylon. It is called *Nalla renga* or *Nalla regoo* and *Narlinge* in Telugu, and *Woonju* in Tamil; it has a maximum height of about 30 feet, with a girth seldom exceeding 5 or 6 feet. The wood is dark-brown, mottled, and very handsome, strong, fibrous, and stiff, close-grained, hard and durable, superior to *Sil* and *Teak* in transverse strength and direct cohesive power, it is much used by the natives for building purposes, beams, &c., and in the construction of carts and ploughs, and makes excellent fuel, being most extensively cut for the Locomotives in the Salem district and along the Bangalore line; the natives use the leaves for washing their hair; the tree grows most rapidly as coppice.



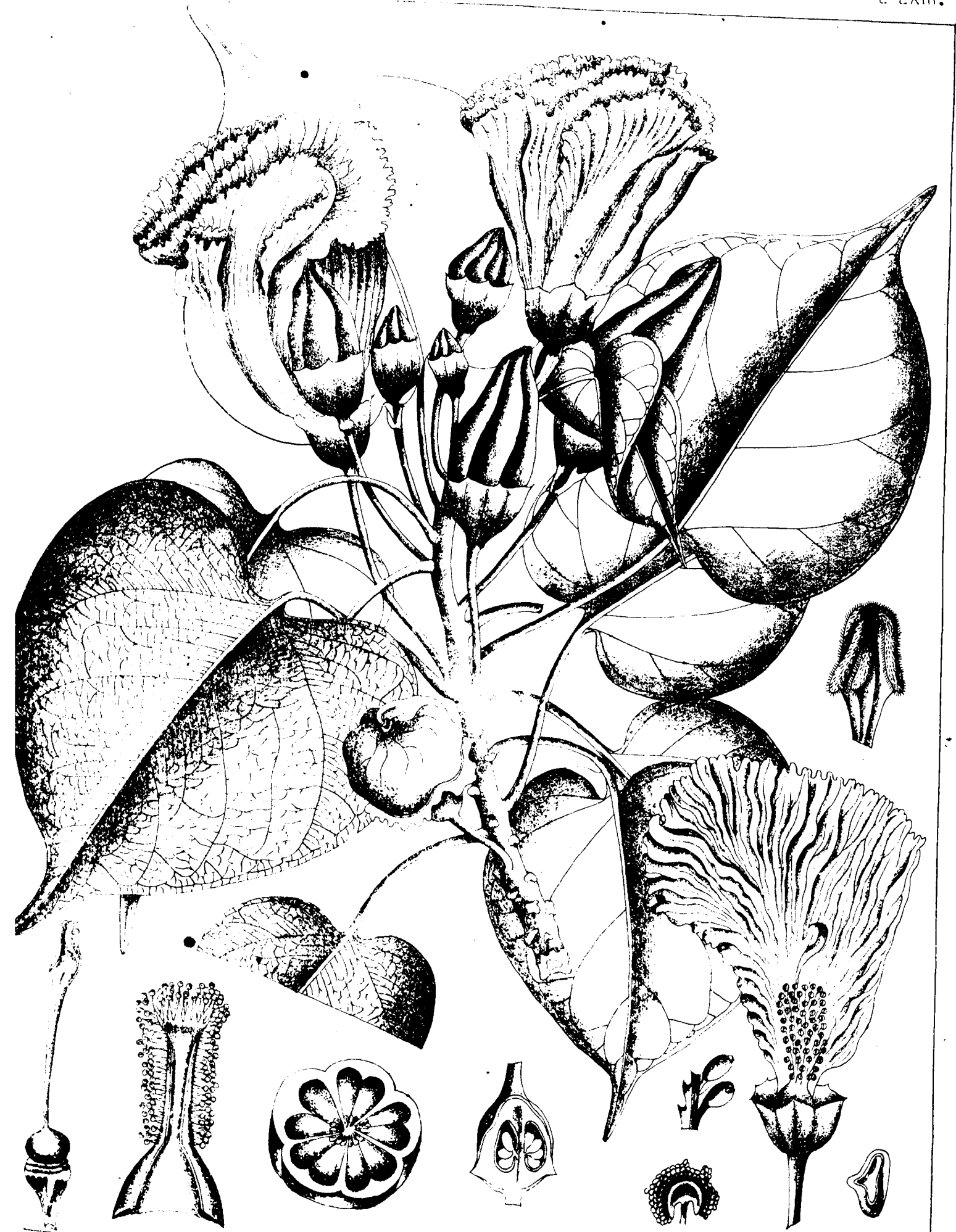
Albizzia amara (Willd.)

THESPESIA POPULNEA. (Nat. order Malvaceae.)

THESPESIA. *Corr. Gen. Pl.* 1. 208. —**GEN. CHAR.** Bractlets 3-8 small or deciduous, calyx minutely 5 dentate, rarely 5 cleft, column toothed at the apex; ovary 5-celled, each cell with a few ovules, styles club-shaped with 5 grooves, capsule woody coriaceous opening loculicidally or almost indehiscent, seeds obovoid glabrous or tomentose, cotyledons much folded enclosing the radicle often marked with small black dots. Trees or shrubs, leaves entire or lobed, flowers yellow; this genus is distinguished from *Hibiscus* by its confluent stigmas, more woody capsule and obovoid compressed seeds.

THESPESIA POPULNEA. (Cav.) A tree, young branches as well as the petioles, pedicels and calyx covered with small peltate scales, leaves long petioled cordate ovate acuminate, 7 nerved, smooth leathery entire or sinuous, stipules falcate, flowers solitary axillary stalked, peduncles shorter than the petiole, epicalyx of 5 oblongo-lanceolate deciduous segments as long as or longer than the cup-shaped entire or slightly 5 lobed calyx, corol nearly 2 inches in length 4 times exceeding the calyx, fruit roundish depressed slightly beaked 5 celled indehiscent or opening to a slight extent at the top, seeds 2 in each cell of the fruit large compressed laterally near the hilum, roundish above, testa pubescent nervoso-striate. *DC.* 1, 456. *Hibiscus populneus*, *Linn. Sp.* 976.

A handsome tree when in flower and of very rapid growth; it rarely exceeds 15 or 20 feet in height, or a circumference of 6 feet; it is abundant throughout India and in Ceylon as an avenue or cultivated tree, particular near the coast, but I have never seen it in forests; it is very generally known by its Hindustani name of *Pāras pipal*, and is called *Pursa* and *Poorsung* in Tamil, and the *Portia* tree by Europeans, and in Ceylon its native name is *Sooreya*. The tree grows very readily from cuttings; any large boughs stuck into the ground rooting readily, but these trees have always the heart wood very unsound, and are only fit for fuel, and besides have a quarrel and ugly appearance; handsome trees are grown from seedlings, and their timber is highly prized, it is strong, straight, even grained and durable, of a pale reddish color fading to reddish brown, and is easily worked. A cubic foot unseasoned weighs 59 to 62 lbs., and seasoned 49 lbs., and the specific gravity is .784; it is much used for gun stocks and also for furniture, boat timbers, masts, felloes, pannels of carriages and cart framing, &c.; the capsules yield a yellow dye which is used as a wash for cutaneous diseases, as is also the bark boiled in water, and the latter is given internally as an alterative.



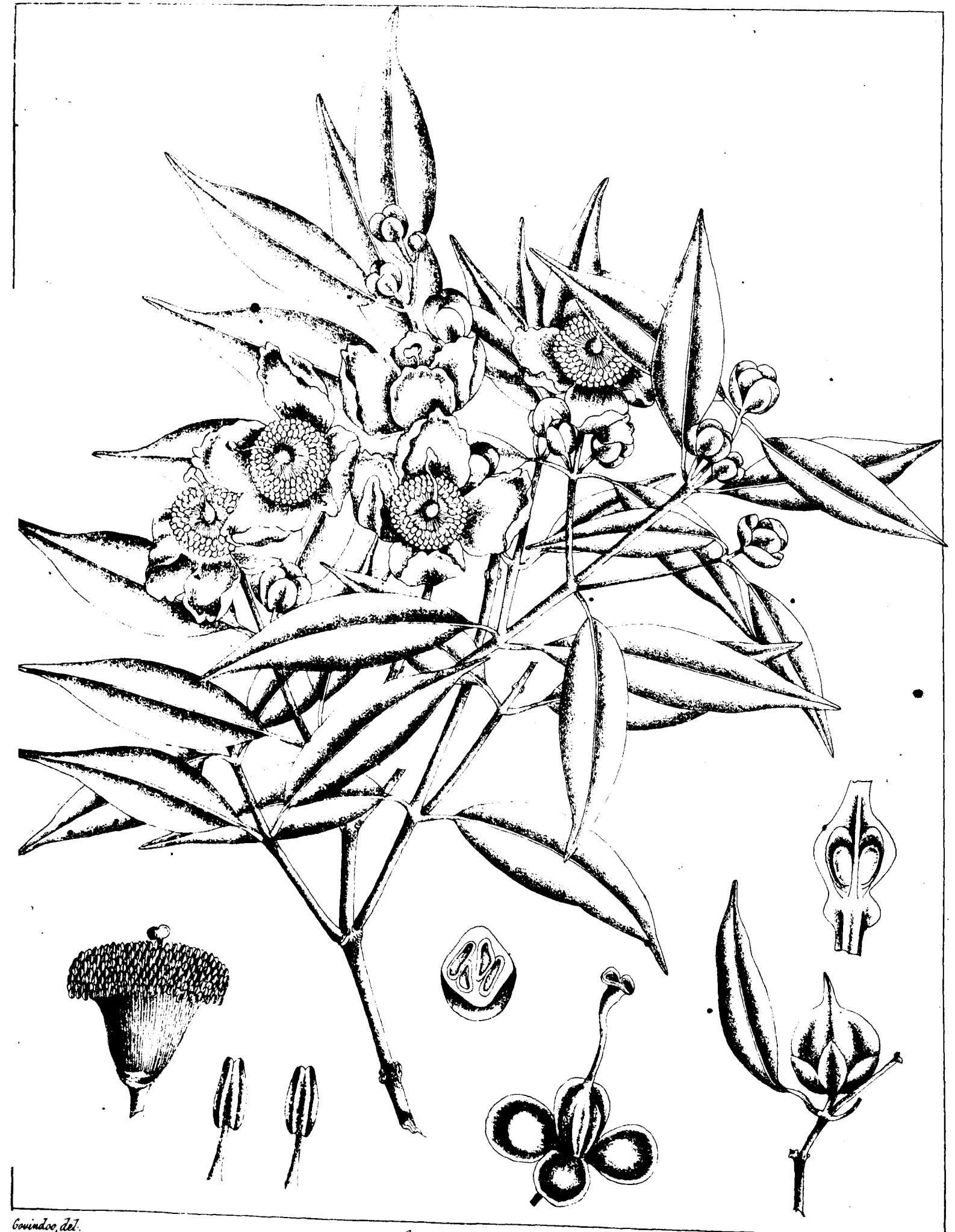
Thespesia populnea (Cav.)

MESUA COROMANDELINA. (Nat. order Guttiferae; Tribe Calophylleae.)

MESUA. *Linn. Gen. Pl.* 1. 176.—**GEN. CHAR.** Flowers hermaphrodite, sepals 4, petals 4, stamens numerous free or connate at the very base, filaments filiform, anthers erect oblong 2 celled dehiscing longitudinally, ovary 2 celled, style elongate, stigma peltate, ovules 2 in each cell erect, fruit from fleshy to nearly woody one celled from the obliteration of the dissipation, 2 valved 1-4 seeded, seed exarillate, cotyledons thick fleshy, radicle very small. Trees, leaves simple oblong lanceolate very shining above, glaucous beneath, flowers large white axillary or terminal solitary.

MESUA COROMANDELINA. (Wight.) Leaves narrow lanceolate ending in a long tapering blunt point, shining above pale or more or less glaucous beneath, $2\frac{1}{2}$ $3\frac{1}{2}$ inches long by $1-1\frac{1}{2}$ broad, petioles $\frac{3}{8}$ of an inch long, flowers axillary and terminal about $1\frac{1}{2}$ inch across when fully expanded, peduncles shorter than the petioles. *Wight Icones Pl.* 117. *Mesua ferrea*, *W. A. Prod.* p. 162 (*Excl. syn.*) *Mesua pulchella*, *Planch. et Triew.*, a Ceylon tree, is very closely allied.

This is a very handsome tree common in most of the mountain forests on the western side of our Presidency, growing with its congener M. speciosa, from which it is readily known by its much smaller leaves and flowers; it is generally known by the name of Nāghā or Nāghā Champa, and is called Nangal and Malay Nangal in Tamil, and on the Tinnevely ghats, where it is very abundant and its timber much in use; it is called Nir Nang to distinguish it from Mesua speciosa which is called Nāng. All the Mesuas have a very hard heavy reddish colored timber known as Iron wood and perhaps the hardest and heaviest timber in India, axemen dislike very much to fell them, as they turn the edge of their axes, the wood is most valuable for engineering purposes and is largely used in Ceylon, and this species is much in use with the natives in Tinnevely, and is looked upon as one of their best timbers, but in the Wynad and other parts, where it is also abundant, it is not utilized and seems hardly to be known.



Govindoo, del.

Mesua coromandelina (Wight.)

Dumphy, Lith.

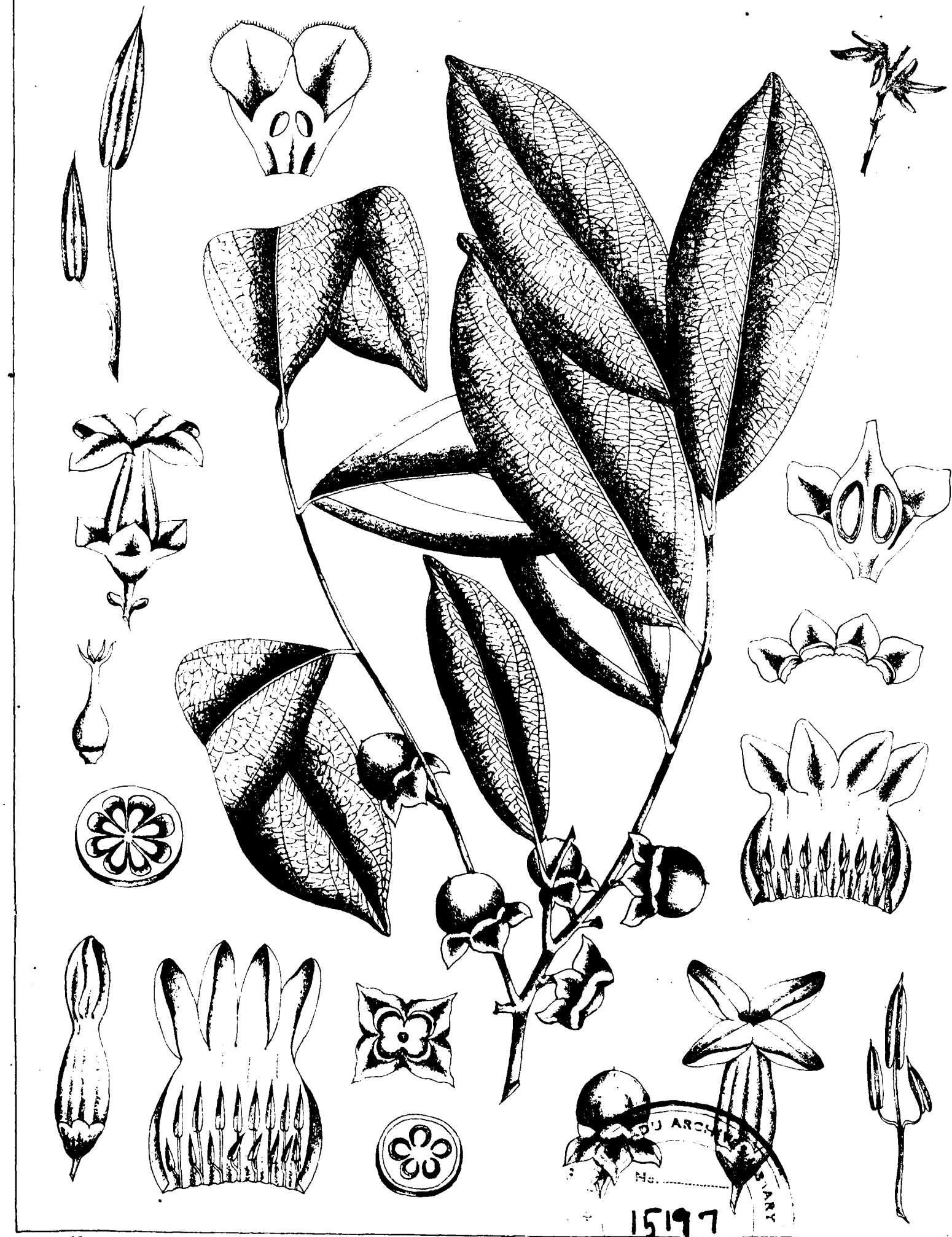
DIOSPYROS EBENUM. (Nat. order Ebenaceæ.)

DIOSPYROS. *Dalech, Dc. Prod. viii, p. 222.*—**GEN. CHAR.** Flowers dioecious, calyx 4-6 lobed or very rarely splitting irregularly, corol tubular campanulate or hypocrateriform aestivation convolute 4-6 lobed, stamens in the male flowers 8-50 generally about 16 inserted at the base of the corol or on the disk or partly on both, filaments of equal length or very unequal and each bearing 1-7 anthers, anthers linear lanceolate, ovary abortive, stamens in the female flowers 0-4-8 or more sterile, ovary 4-8 or rarely 12 celled usually covered at the base with the somewhat enlarged calyx. Trees or large shrubs armed or unarmed, leaves alternate rarely subopposite, flowers axillary, the female solitary, the male usually in little clusters.

DIOSPYROS EBENUM. (Retz.) A large tree, leaves glabrous shining membranaceous or slightly coriaceous, oblong obtuse or shortly and bluntly acuminate, 2-7 inches long by $\frac{3}{4}$ to $2\frac{1}{2}$ broad, petioles 2-4 lines long, male peduncles short pilose bracteate about 3 flowered, calyx funnel-shaped slightly pilose, 4 cleft at the apex, corol long hypocrateriform shortly 4 cleft at the apex, stamens 8-10 inserted on to the base of the corol, generally 2 cleft, each division bearing an anther, one of which is much longer than the other, sometimes 3-4 cleft with as many anthers, no rudiment of an ovary, female flowers solitary, calyx 2 bracteate much larger than in the male, deeply 4 cleft with a callous elevated, 4 lobed marginal ring round its mouth, stamens 8 with double anthers (sterile) inserted on to the base of the corol, stigmas 4, ovary 8 celled, albumen not ruminant. *Dc. Prod. viii, p. 234*;—*Wight's Icones, t. 188.*

This valuable tree is not uncommon in our mountain forests on both sides of the Presidency and in Ceylon; it yields the best kind of Ebony, generally jet-black but sometimes slightly streaked with yellow or brown, it is very heavy, close and even grained, and stands a high polish, unseasoned it weighs 90 to 100 lbs. the cubic foot and 81 lbs. when seasoned, and has a specific gravity of 1.296; it is used for inlaying and ornamental turnery and sometimes for furniture, but there is not much demand for it in this Presidency. The sap wood is white, hard, close-grained and strong but not durable, but is used by the natives for various purposes; it is called Nalluti in the Cuddapah and Kurnool hill forests, where the tree is very common and well known. The tree figured by me in my Annual Report for 1866-67 as Diospyros assimilis is very nearly allied if distinct as a species, it differs however in each of the stamens in the male bearing 4-6 anthers instead of generally only 2 and the stamens in the female flower being single instead of double, its leaves turn very black in drying; it is called Kará mārā in the South Canara forests, where it is very common both in the heavy forests in the plains and on the ghats.

The plate represents a fruiting branch of the female tree, a flowering twig of the male, and dissections of the flowers of both sexes.



Govindoo, del.

Diospyros Ebenum (Retz.)

Dumphy, lith.

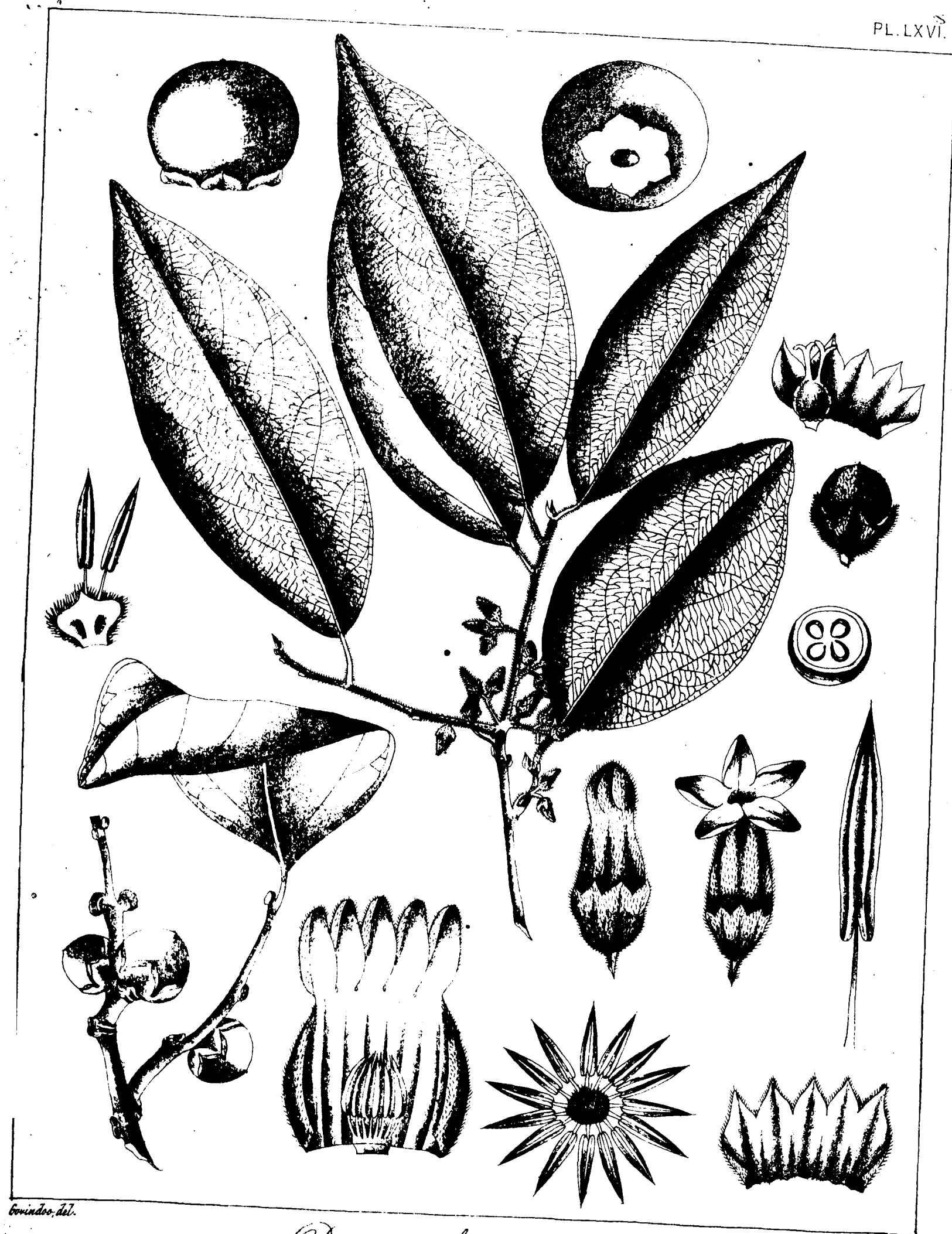
DIOSPYROS EXSCULPTA. (Nat. order Ebenaceæ.)

For Gen. Char. see under "Diospyros Ebenum."

DIOSPYROS EXSCULPTA. (Ham.) A good sized tree, all the young parts covered with rusty down, leaves alternate and opposite, oval to elliptic attenuated at both ends softly downy, 3-5 inches long by 1½-2 broad, petioles ¼ to ½ inch long, male peduncles a little shorter than or the length of the petioles, 3 flowered, calyx campanulate, 4-6 lobed at the apex, lobes acute erect, corol gibbous 4-6 parted, divisions of the corol very downy rounded at the apex, stamens 10-15 seated on the hairy receptacle, no rudiment of an ovary, female flowers solitary short pedicelled, calyx deeply 4-6 parted with the lobes reflexed at the margin outwards, corol 4-6 parted, divisions rounded at the apex, stamens none, ovary round hairy 4-5 celled, styles 2 each 2 cleft, fruit size of a pigeon's egg edible. *De. Prod.* viii, p. 223. *Diospyros tomentosa*, *Roxb. F. Ind.* ii, p. 532.

This valuable tree is not uncommon in the Cuddapah, Salem and Kurnool forests, and probably elsewhere in our Presidency, and is found in Bengal and Bombay, it grows to a considerable size and yields a valuable jet-black ebony very similar to that of ebenum, in fact I doubt if the 2 woods could be easily distinguished; it is called Tunki in the Cuddapah district and Tumboornee in the Bombay Presidency. The tree sheds all its leaves in the cold season, and they appear again with the flowers in the beginning of the hot weather.

The plate gives a branch of the male tree in flower and a branch of the female in fruit, and dissections of both male and female flowers.



Diospyros exsculpta (Ham.)

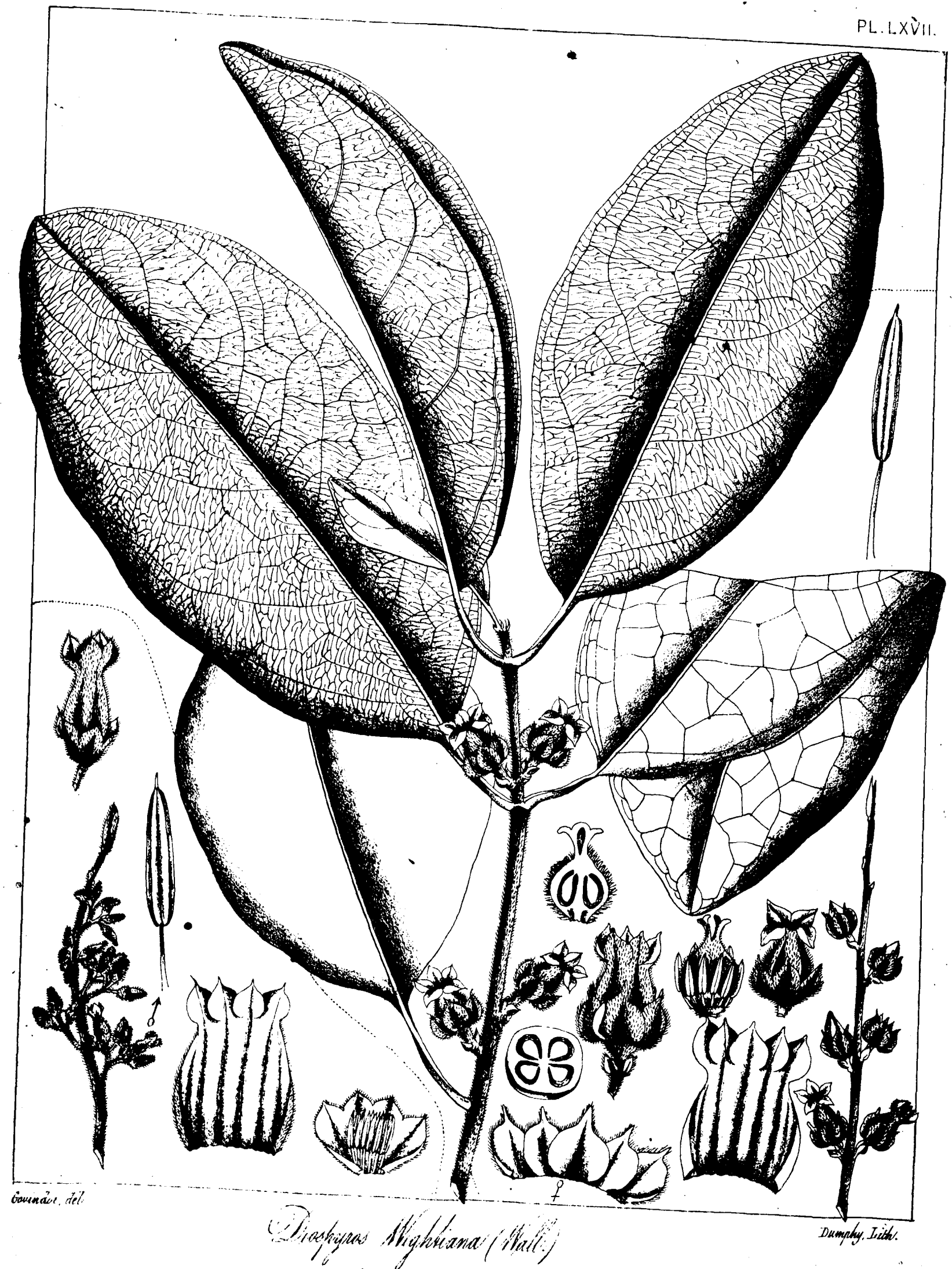
DIOSPYROS WIGHTIANA. (Nat. order Ebenaceae.)

For Gen. Char. see under "D. Ebenum."

DIOSPYROS WIGHTIANA. (Wall.) Arboreous, young parts and inflorescence densely velvety with golden or rust colored down, leaves alternate and opposite oblong or oval acute or obtuse or sometimes cordate at the base densely velvety beneath, less so or glabrescent above 3-7 inches long by $1\frac{1}{2}$ to 3 broad, petioles $\frac{1}{4}$ to 1 inch long velvety, male flowers on small cymose peduncles which are the length of or longer than the petioles and densely velvety bearing 6-9 flowers on 2-3 pedicels, calyx tubular slightly 4-5, cleft at the apex, teeth sharp erect, corol tubular 4-5 lobed at the very apex, lobes acute, stamens about 13 seated on the disk, no rudiment of an ovary, female flowers solitary on thick peduncles which are bracteated at the apex and much shorter than the petioles, calyx deeply 4-5 lobed with the lobes acute and reflexed at the margin outwards, corol about twice as long as the calyx, tubular 4-5 lobed at the apex glabrous within and outside at the base, lobes acute, stamens 8-10 sterile seated on the disk, ovary 4 celled, styles 2 each 2 cleft, fruit large edible. DC. Vol. viii, p. 223.

This tree is common in most of our dry forests, and until I examined it critically I always considered it the *D. melanoxylon*, which species I have not met with if distinct from this, but this has always a 4 celled ovary, and quite answers to the description of *D. Wightiana* as given in De Candolle's *Prodromus*; its heart wood yields a jet black ebony like the two former, but the trees are always small and stunted in the trunk, as far as I have observed, and all ebony in log I believe comes from the two former species. It is called *Tendu* in Hindustani, and *Tunki Tumi* and *Tumbi* in Tamil and Telugu; it sheds its leaves in the cold season, and they appear again with the flowers yearly in the hot season.

The plate gives a flowering branch of the female tree, and a flowering twig of the male, and dissections of both male and female flowers.

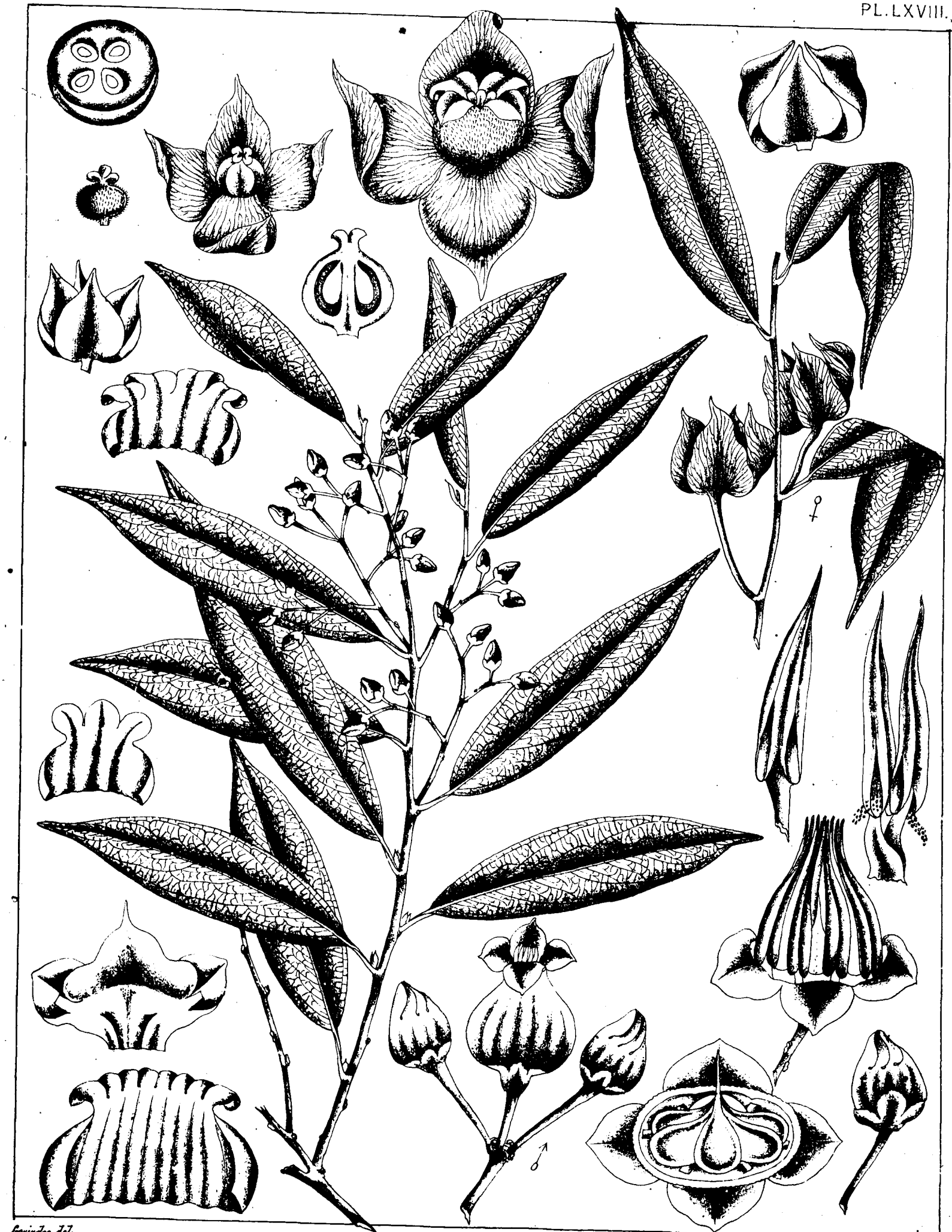


DIOSPYROS CALYCINA. (Nat. order Ebenaceae.)

DIOSPYROS CALYCINA. (Bedd.) A good sized tree, every where glabrous, leaves dark shining green narrow lanceolate attenuated at the base, tapering at the apex into a very blunt point about 3-3½ inches long by a little less than 1 inch broad, petioles about ¼ inch long, male cymes about half the length of the leaves 3-9 flowered, calyx small 4 toothed, corol urceolate very gibbous at the base 4 lobed at the apex, bright yellow in color, stamens 6 or 8 each with 2 anthers of equal length placed on the disk surrounding the large rudimentary ovary, apex of the anthers inflexed and meeting over the sterile ovary which latter is 5 lobed and terminates in a long acumination, filaments slightly hairy; female flowers solitary on long peduncles nearly half the length of the leaves, calyx of 4 rarely only 3, large cordate imbricate nerved segments which enlarge with the fruit, corol urceolate gibbous tube nearly globose, 4 rarely only 3 cleft at the apex, divisions reflexed, staminodia none, ovary 4-celled, stigmas 4 or 3 sessile, fruit globose, covered with hairlike scales. *Bedd. Annual Report of the Conservator of Forests, Madras Presidency, for 1867-68, t. 1 and 2.*

This very curious species of Diospyros has only been observed in the Tinnevely district and southern portions of Madras, where, however, it is very abundant in the ghat forests from the foot up to 3000 feet elevation; it is called Vellay Toveray, and yields a valuable light colored wood, which is much in use in the Tinnevely district.

The plate gives a flowering branch of both male and female trees, and dissections of the flowers of both sexes and young fruit.



Diospyros calycina (Bedd.)

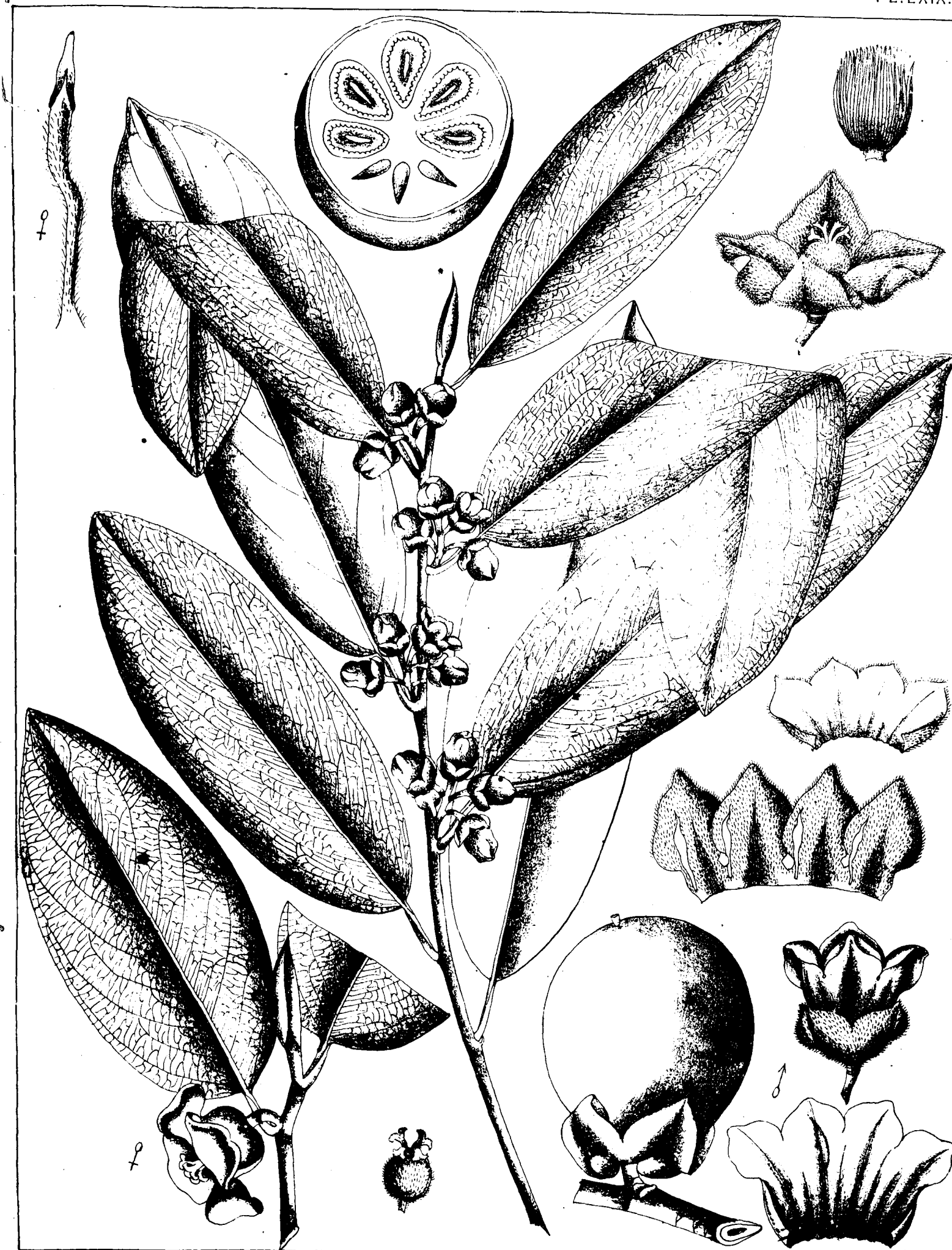
Dumphy, lith.

DIOSPYROS EMBRYOPTERIS. (Nat. order Ebenaceae.)

For Gen. Char. see under "D. Ebenum."

DIOSPYROS EMBRYOPTERIS. (Pers.) A middling sized tree, trunk erect straight, bark blackish rust colored, branches spreading smooth, leaf buds silky, leaves alternate lanceolate or elliptic coriaceous, quite glabrous and shining, about 6 inches long by 2 broad, petioles about $\frac{1}{4}$ an inch, male peduncles axillary, the length of the petioles 3-5 flowered pedicels reflexed minutely pubescent furnished with 1 small deciduous bract, calyx spreading shortly 4 lobed hairy outside, corol campanulate nearly 3 times as long as the calyx, 4 cleft about half way down lobes ovate ciliate, filaments about 20 double bearing 40 erect linear anthers; female flowers axillary solitary much larger than the male, peduncles and calyx pubescent, filaments 1-4 sterile situated on the corol near the base, ovary globular 8-12 celled with one pendulous ovule in each cell, styles 4-6? spreading, stigmas branched 2-3 cleft, berry globular size of a small apple, yellow and covered with rust colored farina, seeds usually 5-8 immersed in pulp. *DC. Vol. viii, 235. Diosp. glutinosa, Roxb. Fl. Ind. ii, 533.*

This is a common tree on the western coast, particularly near backwaters, and is also found in many of our forests in Bengal, Mysore, Bombay and Ceylon; it is called Gaub in Hindustani, Tumil in Telooquo, and Timberee in Ceylon; the timber is only of average quality, and is used for building purposes, and the very viscid juice of the young fruit is used for paving the seams of fishing boats, and fishing nets, and lines are steeped in it for durability, and the unripe fruit contains a very large portion of tannin. Masts and yards of country vessels are made from this tree in Ceylon.

*Diospyros Embryopteris (Pers.)*

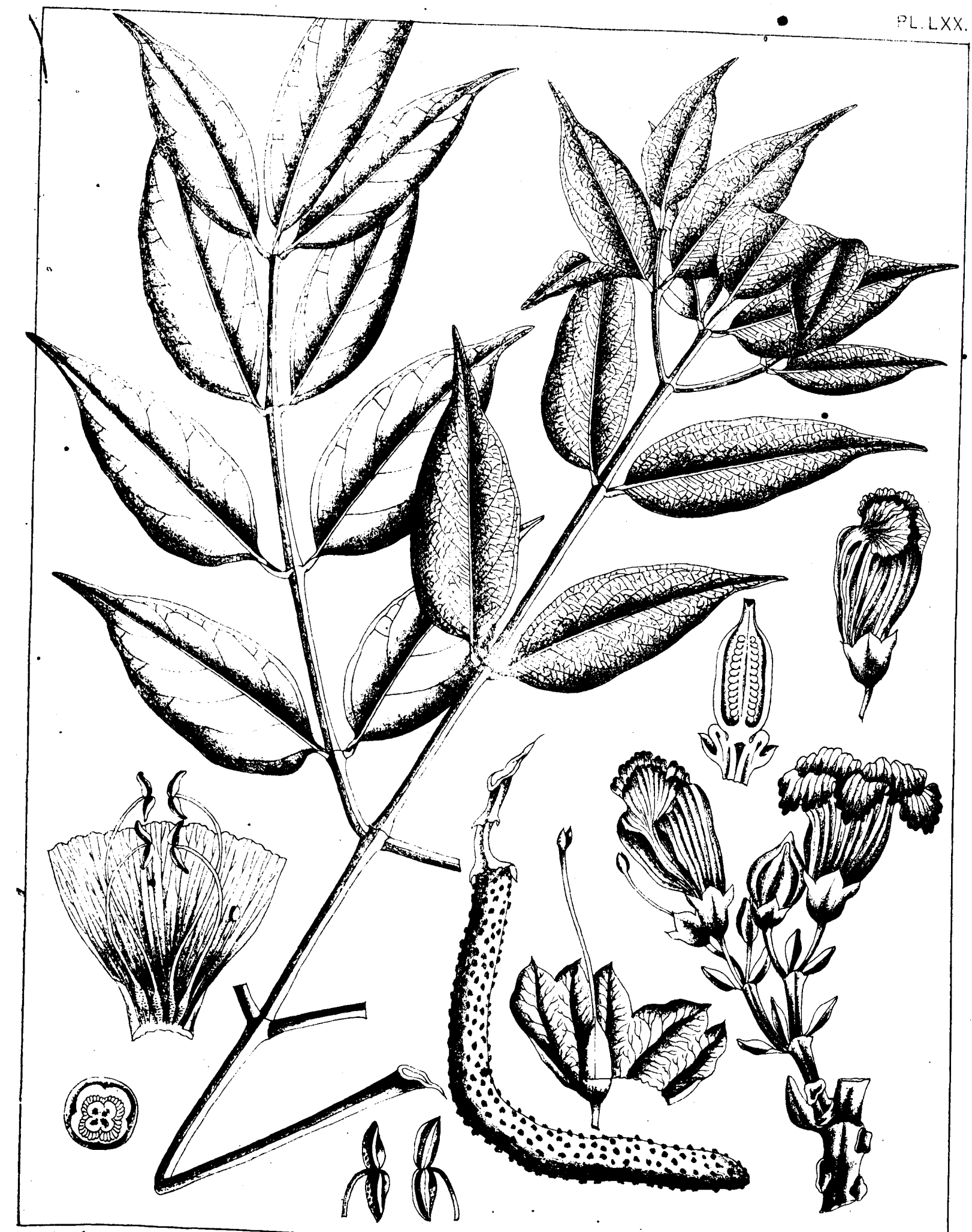
BIGNONIA XYLOCARPA. (Nat. order **Bignoniaceæ.**)

BIGNONIA. *Linn. DC. ix., 143.* — **GEN. CHAR.** Calyx 5-toothed at the margin rarely entire or 5-parted or 2-3 lobed, corol 2 lipped or nearly equal 5 cleft, stamens 4 fertile didynamous a 5th sterile; anthers with glabrous cells very often distinct, stigma bilamellate; capsule with the valves scarcely convex or flat, partition flat parallel to the valves; seeds in a single row at each side of the partition, winged on both sides, wing pellucid. Trees or shrubs, leaves almost always opposite but very various.

BIGNONIA XYLOCARPA. (Roxb.) A large tree, trunk straight, bark ash-colored rather spongy and considerably cracked, branches sparse, leaves opposite bi-tripinnate 1-4 feet long, leaflets short petioled from semi-cordate to obliquely-oblong entire acuminate glabrous but hard 2-5 inches long by 1-1½ broad, petioles common and partial channelled and sharply angular scabrous with elevated gray specks, panicles terminal corymbose branches several times dichotomous with a single flower in the forks slightly pubescent, bractes ovate-oblong, flowers large white with a tinge of yellow very fragrant, calyx campanulate unequally 5-toothed colored corol campanulate shortly tubular with 5 rounded much curled lobes, stamens as in the genus with a fifth sterile one, ovary oblong with an annular disk round its base 2-celled with numerous ovules attached to 2 thick equi-distant receptacles on each side of the partition, style the length of the stamens, stigma of 2 oblong lobes, capsule linear variously bent about 2 feet long by 1-1½ inches in diameter, of a very hard woody texture and extremely rough with numerous hard tubercles, 1 celled 2 valved partition contrary sub-cylindric spongy, seeds numerous winged, cotyledons thin nearly round emarginate, radicle short. *Roxb. Fl. Ind. iii. 108.*

A common tree in almost all the Madras forests and in Mysore, Bengal and Bombay; the leaves are deciduous in the cold weather and appear again with or a little after the flowers in March or April; it is a handsome tree and a rapid grower, and worthy of cultivation for ornamental purposes; it is called Vadencarni in Tamil; wood brownish yellow, rather close-grained, takes a good polish, and is used for cabinet purposes.

The plate represents only a portion of a flowering panicle and a very young fruit.



Govindoo, del.

Bignonia xylocarpa (Roxb.)

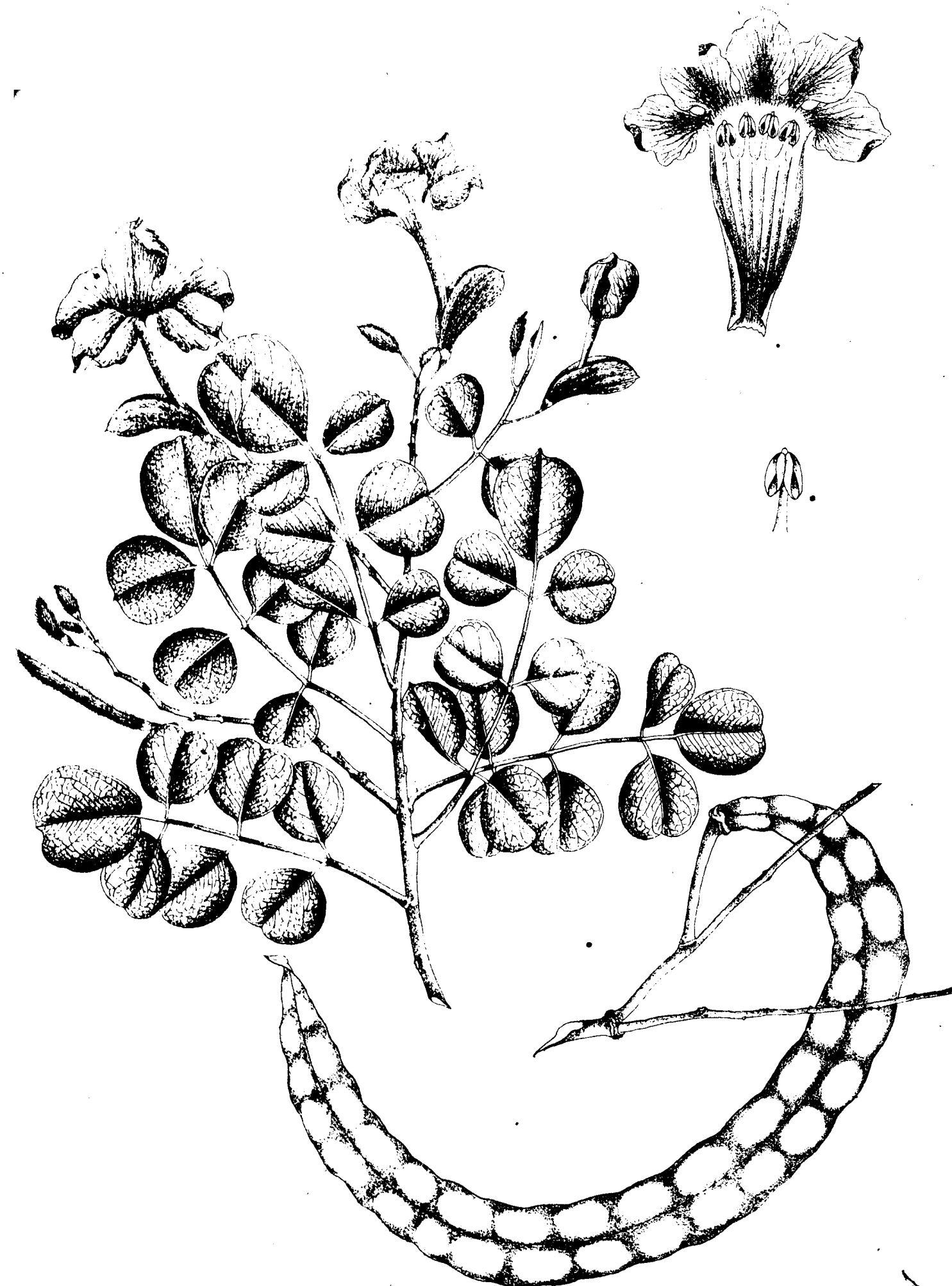
Dumphy, Lith.

SPATHODEA FALCATA. (Nat. order Bignoniaceæ.)

SPATHODEA. Beauv. DC. Prod. ix, 203.--GEN. CHAR. Calyx spathaceous closed when young at length longitudinally split, then toothed or entire, corol somewhat infundibuliform, limb 5 cleft slightly unequal, stamens 4 didynamous with a fifth sterile, anthers with the cells separate, stigma bilamellate, capsule 2-celled loculicidally debiscing, partition contrary corky or coriaceous, seeds corky membranaceously winged, attached to the partition, not immersed in pits. Trees, leaves opposite rarely alternate, simple, conjugate digitate or unequally pinnate.

SPATHODEA FALCATA. (Wall.) A small tree, trunk very irregular in size and shape, bark light ash-colored, young shoots covered with whitish-down, leaves opposite and alternate unequally pinnate, 3-6 inches long by $1\frac{1}{2}$ -2 broad, leaflets opposite 2-3 pairs with a terminal odd one nearly orbicular often very retuse at the apex entire slightly downy short petioled from 1 to 3 inches both ways, racemes about as long as the leaves few flowered, flowers white pretty large, calyx a spathe about $\frac{2}{3}$ open on the convex side, corol tube longer than the calyx, cylindric border about $\frac{1}{2}$ inch across, 5 parted divisions flat equal oblong, stamens as in the genus with a fifth sterile one sometimes present, stigma 2-lobed and capsule linear about 8-12 inches long pendulous twisted in various forms. Wall. List No. 6517. Bignonia spathacea, Roxb. Fl. Ind. iii, p. 103.

A small or middling sized tree common in most of the forests in the Madras Presidency, in Mysore and Bombay, but not found in Ceylon or Birma; it is called Wodi in Teligoo. The timber is light colored, strong and serviceable, and much used by the natives for agricultural purposes, building, &c.



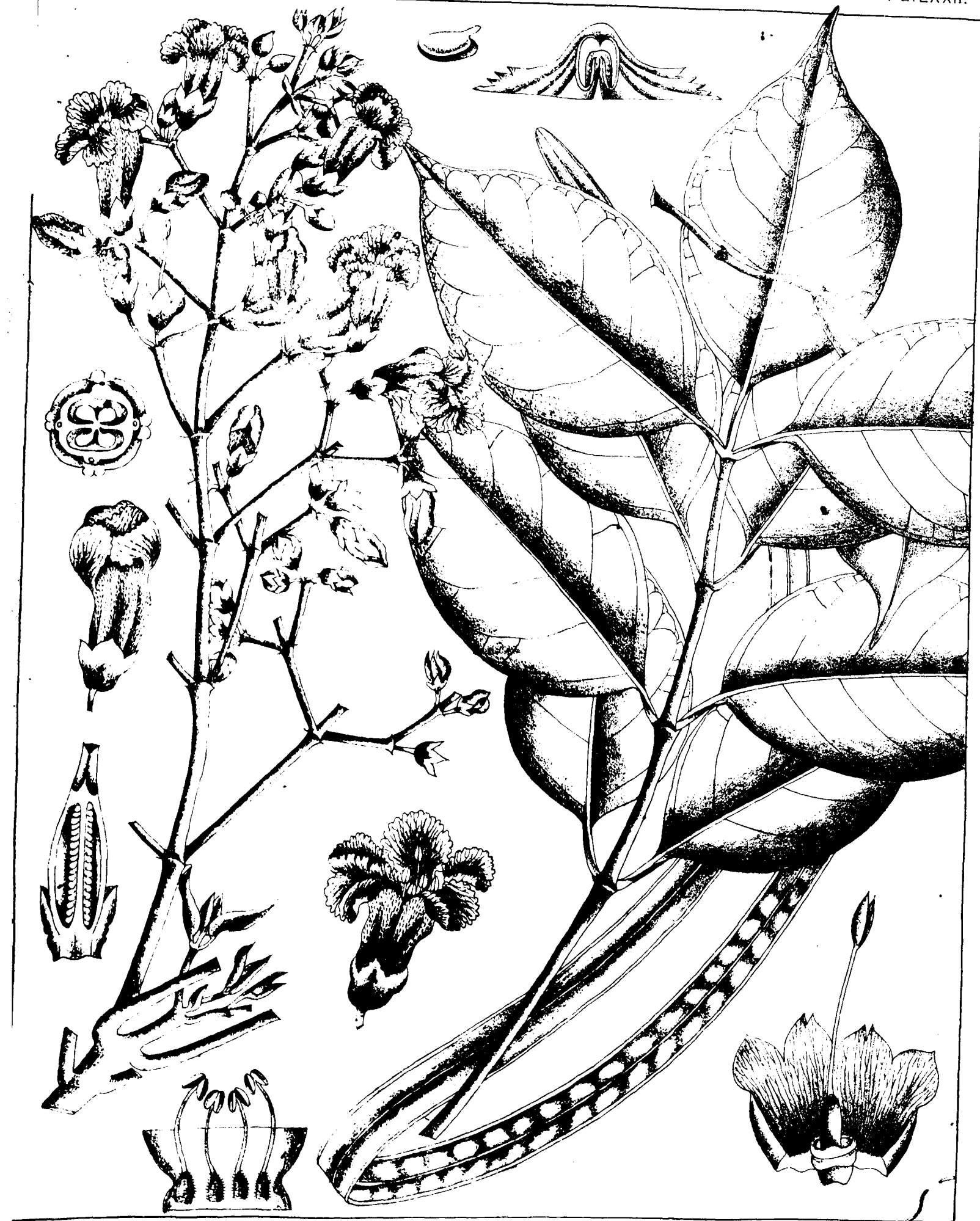
Spathodea falcata (Wall.).

• STEREOSPERMUM CHELONOIDES. (Nat. order Bignoniaceae.)

STEREOSPERMUM. *Cham. DC. Prod. ix, 210.* — GEN. CHAR. Calyx coriaceous cup-shaped cylindric subtruncate obtusely 5 toothed, corol tube straight campanulate limb bilabiate, 5 lobed, stamens 4 fertile, and a fifth small sterile, anthers 2 lobed naked, disk fleshy 5 lobed, ovary cylindric stigma bilamellate, capsule tetragonous or cylindric elongated membranaceous, partition contrary to the valves very cellular and corky thick, seeds bony thinly winged laterally immersed, except the wings, in notches in the partition.

STEREOSPERMUM CHELONOIDES. (Willd.) A large tree, trunk very straight and of great height and thickness, bark thick scabrous brown, branches very numerous, the inferior horizontal, above gradually becoming more and more erect, leaves opposite unequally pinnate about 1 foot long, leaflets opposite with an odd one short petioled generally 4 pair, the inferior smallest obliquely oval ovate or oblong entire pointed sometimes slightly notched about the margin, glabrescent, about 4 inches long by 2 broad, panicles terminal the larger ramifications decussate, the smaller or terminal 2 forked with a sessile flower in the fork, peduncles and pedicels round covered with oblong gray scabrous specks, bracts small caducous, flowers pretty large yellowish very fragrant, calyx 4 (—5?) toothed at the apex, with the two upper teeth bidentate, disk a yellow fleshy ring round the base of the ovary, filaments as in the genus with a fifth sterile one, anthers double, stigma 2 cleft, capsule nearly 2 feet long slender twisted sharply tetragonous, receptacle of the seeds spongy white with alternate notches along the sides in which the seeds lodge. *Roxb. Fl. Ind. iii. 106*; — *Wight Icones, t. 1341.*

This handsome tree is very common in almost all the forests of the Madras Presidency, up to an elevation of about 3000 feet, and in Mysore, Bombay, Bengal, Birma and Ceylon, it is generally known by the Tamil name of Pādri and is called Kūli goru and Moka Yāpā in Telugu, Pādel in Bombay, Loomoo madula in Ceylon, and in Birma Thākooppo. The wood is of a beautiful orange yellow color, close and even grained, elastic and durable, easily worked, and gives a smooth glossy surface; a cubic foot weighs 57 to 60 lbs. unseasoned, and 48 lbs. when seasoned, and its specific gravity is .768; the sapwood is rather coarse-grained, of a brownish white color, and not durable. The wood is much used in housebuilding and for a variety of purposes by the natives; the roots, leaves, and flowers are used medicinally.



Stereospermum chelonoides (Willd.)

MENISPERMACEÆ. (By Prof. Oliver.)

Flowers small, dioecious. Sepals usually 6, sometimes 9-12, rarely 4 or 1, nearly always free, usually imbricate, in 2-4 series, the outer smaller, often very minute. Petals 6, shorter than or not exceeding the inner sepals, rarely 4 or fewer, free or united or 0. Male flowers: Stamens equal in number and opposite to the petals, rarely fewer or more, free or united; anthers free, 2-4 celled, dehiscing longitudinally or transversely, or connate in a peltate disk. Female flowers: Staminalia 6 or 0. Carpels free, usually 3, in few genera 1 or 6-12, sessile or stipitate; stigma terminal, entire or divided. Ovules solitary, usually amphitropous. Fruit-carpels drupaceous, with the scar of the style subterminal or by eccentric growth brought near to the base. Seed concave or sulcate on the inner face, often curved in the form of a horseshoe around an intruded portion of the putamen, with uniform or ruminate albumen or exalbuminous; embryo with the cotyledons appressed or divaricate,—(climbing or twining shrubs or more rarely perennial herbs or) trees. Leaves alternate, exstipulate, usually palminerved, entire or lobed. Flowers small or minute, fascicled, cymose racemose or paniced, rarely solitary.

An order containing several genera of creepers but of no interest to the forester. The only tree or shrub being a species of *Cocculus*, a small tree common in sholas on the higher ranges of the Anamallays.

COCCULUS. DC.

Gen. Pl. i. 36.—*Gen. char.*: Sepals 6, in 2 series, 3 inner larger. Petals 6, shorter than the inner sepals, entire or bidentate, concave or with involute margins embracing the stamens. Male flower: Stamens 6, free with 4-lobed anthers. Female flower: Staminalia 6 or 0. Carpels 3, with erect or recurved undivided styles. Drupes rotundate or obovate, compressed, with the scar of the style near the base. Putamen tuberculate or transversely rugose. Seed horseshoe-shaped, curved around opposite intruded processes of the putamen; embryo with linear appressed cotyledons in a small quantity of fleshy albumen.

COCCULUS LAURIFOLIUS. DC.—A small tree or large shrub, leaves lanceolate coriaceous glabrous shining acute or acuminate mucronulate 3 nerved, 3-6 inches long, 1-1½ broad, petiole ½-1 inch long, panicles axillary or a little above the axils solitary or 2 superposed, 1-2 inches long, corymbose, the male generally the larger, bractes minute early deciduous, flowers minute, exterior sepals a half shorter than the interior acute, petals deeply 2 lobed, lobes obtuse or acute, sterile stamens 6 in the female flower, ovaries broadly oval, style cylindrical reflexed-drupe small rotundate. *H. f. et T. Fl. Ind.* 1. p. 191. *Menispermum laurifolium, Roxb. Fl. Ind.* iii. 815.

A small tree common in the moist woods on the higher ranges of the Anamallays 5-7,000 feet, and also found on the Himalayas and in Japan.

Analysis of Genera. Pl. II.

Male and female flower and fruit cut open of *Cocculus cordifolius*.

BERBERIDACEÆ.

Flowers hermaphrodite. Sepals petaloid, usually 3-6-9, and petals 6 or more, fewer or 0, free, hypogynous, early deciduous, all or the inner imbricate in aestivation. Stamens usually 6 or 4, free hypogynous, opposite to the petals; anthers erect, 2-celled, usually dehiscing by valves. Pistil of a solitary, free carpel; ovary 1-celled; stigma usually with a peltate, discoid or dilated stigma, sessile or with a short style. Ovules few, basal or several on the ventral suture, anatropous. Fruit an indehiscent drupe. Trees and shrubs. Leaves alternate fasciculate or radical, simple (unifoliate) or compound. Flowers racemose paniculate cymose or solitary, usually yellow or white. An order represented in S. India by only two small trees.

BERBERIS. L.

Gen. char.: Sepals 6-9, petaloid. Petals 6, about the same size or little smaller than the sepals. Stamens 6; anthers dehiscing upwards in two valves; stigma peltate. Ovules few, erect. Shrubs with the first leaves of the shoots often reduced to spines, bearing the fasciculate 1-foliate leaves in their axils. Flowers yellow, racemose, fasciculate or solitary.

BERBERIS ARISTATA. DC. Sys. Veg. xi. 8.—A shrub leaves simple coriaceous more or less persistent usually obovate or oblanceolate, spinuloso serrate or entire about 1 inch long, spines deeply divided into 3 sharp rigid segments, racemes pendulous or suberect longer than the leaves, pedicels slender petals distinctly biglandular, filaments without teeth, stigma of the ovary and fruit supported on a short style. *Berberis tinctoria. Less. WA. Prod.* p. 16.

A large shrub or small tree common on the higher ranges of the mountains on the western side of the Madras Presidency, and in Ceylon and the Himalayas, it is very closely allied to the common Barberry (*B. vulgaris*) which is found on the Himalayas and in Europe, and which differs principally in its sessile stigma; the wood and the root contain a useful yellow coloring matter, and both the root and fruit are used medicinally.

2. *BERBERIS NEPALENSIS. Spr.*—A small tree bark very rough with deep fissures, leaves pinnate, leaflets 6-12 pairs, ovate nearly equal in size, slightly cordate at the base repand with 6-8 thorny teeth at each side about 5-nerved at the base, lower pair of leaflets close to the stem, racemes elongated slender, bracteoles at the base of the pedicel, oblong obtuse, petals with 2 distinct glands, filaments without teeth: berry globose crowned with the evident style and stigma. *Spr. Sys.* ii. 120;—*Hook. & Thom. Fl. Ind.* p. 219. *B. Leschenaultii, Wall. l. n.* 1479;—*WA. Prod.* p. 16. *Mahonia Nepalensis, DC. Prod.* 1.109.

A small tree common on the Nilgiris and Western ghats in the Madras Presidency, from 5000 feet and upwards, inhabiting also the Himalayas and Khasya mountains, the Nilgiri species was considered distinct by Dr. Wallich, and named after M. Leschenault but it is not separable from the N. Indian tree.

The wood is of a most brilliant yellow color, and might be used for inlaying purposes; it is however rather soft and porous. The tree is called Jakkahi on the Nilgiris, is very ornamental, and often planted in gardens; though always a small tree in S. India it is seldom more than a shrub in the North.

Analysis of Genera. Pl. II.

Dissections of the flower and fruit of *Berberis Nepalensis*.

CAPPARIDACEÆ.

Flowers regular or the sepals or petals sometimes unequal, rarely polygamous. Sepals 4, rarely 3 or 5, free or connate below valvate, imbricate or open in æstivation. Petals 4 or 0, rarely 3 or indefinite, sessile or clawed. Torus sometimes with a linear, oblong or ligulate-tubular appendix. Stamens definite or indefinite, inserted upon the torus, which is sometimes shortly columnar, or the filaments adherent more or less to the gynophore; filaments equal or unequal usually filiform; anthers usually oblong or linear, 2-celled, dehiscing longitudinally (some of them effete in certain species). Ovary sessile or supported upon a gynophore of various length, usually ovoid, globose or oblong, 1-celled or divided by spurious dissepiments into 2 or more cells. Ovules indefinite, sometimes few, parietal. Fruit a siliquiform capsule, or baccate, oblong, globose or elongate, cylindrical or torulose, many-or few, rarely 1 seeded. Seeds usually more or less reniform, or somewhat angular in baccate fruits with a crustaceous or coriaceous testa; albumen thin or 0. Embryo usually curved; cotyledons plane, folded or convolute; radicle often conical and incumbent. (Herbs) shrubs or trees, often scandent, glabrous pubescent tomentose glandular or scabrid. Leaves alternate rarely fasciculate, simple or 3-7-foliate, leaflets usually entire; stipules, when present, minute or represented by short spines. Flowers axillary or terminal, solitary racemose corymbose fascicled or umbellate, often showy.

An order of no importance to the forester, being only represented in S. India by 4 small trees, viz. 2 belonging to the genus *Capparis*, and 2 to *Cratæva*, and a few shrubs; the genera *Gynandropsis*, *Cleome*, *Polauisia*. *Nieuburia* and *Cadaba* yield herbaceous plants or very small shrubs. *Cratæva religiosa* will be figured in the plates, and analysis of 1 species of *Capparis* is here given:—

Leaves simple, branches often spinose..... *Capparis*.
Leaves trifoliate, unarmed..... *Cratæva*.

CAPPARIS. L.

Gen. Pl. i. 108.—Sepals 4 (very rarely 5), free or connate at the base (or united and splitting irregularly in some species), equal or the two outer broader and more concave or the two inner petaloid, imbricate or valvate, or in two series, the outer pair valvate in æstivation. Petals 4. Stamens indefinite (8-∞), inserted upon the torus. Filaments free. Ovary upon a gynophore usually from $\frac{1}{2}$ to 2 inches in length, 1-celled or sometimes few-celled, with 2 or more parietal placentas; ovules usually indefinite; stigma sessile. Fruit stipitate with one or many seeds, indehiscent or sometimes separating into 3 or 4 valves. Trees or shrubs (often climbing or sometimes prostrate), unarmed or with short, often recurved, stipular spines. Leaves simple, coriaceous or submembranous, rarely wanting. Flowers usually hermaphrodite, solitary, racemose, corymbose, or umbellate, axillary or terminal.

CAPPARIS APHYLLA, *Roth. Nov. Pl. Sp.* 238.—A much branched, glabrous tree or shrub. Branches terete, leafless, excepting in young plants and on barren shoots, usually with short, nearly straight or ascending stipular spines. Leaves, when present, linear or linear-lanceolate. Flowers red, about 1 inch in diameter, in lateral and terminal fascicles or corymbose racemes. Pedicels $\frac{1}{2}$ inch or shorter. Sepals unequal in breadth; the anterior outer sepal larger and deeply saccate, but slightly imbricate or subvalvate (at least the 2 outer) in æstivation. Ovary on a gynophore of $\frac{1}{2}$ – $\frac{3}{4}$ inch. Style about half as long as the ovary. Fruit ovoid red size of a cherry, pointed or subglobose, several or many-seeded. *C. Sodada*, Brown in Denham and Clapp. *App.* 20. *Sodada decidua*, *Porsk. Fl. Egypt.* 81; *Delile Fl. Egypt.* t. 26.

A small tree found in the Coimbatore, Madura and Tinnevely districts, also in the Punjab, Guzerat and the Dekhan, delighting in an arid climate; its general girth is only about 2 feet, but one of 8 feet in girth has been mentioned by Mr. Edgeworth. It is commonly used for fuel, burning with a strong flame even when green; its wood is also stated to be durable, and from its bitter qualities, not liable to the attacks of white-ants; it is used for rafters, ploughshares and for knees in boat building. The fruit is eaten by the natives.

CAPPARIS STYLOSA, *DC. Prod.* 1. 246.—A small tree or large shrub, stipules thorny short straight, leaves from exactly linear to elliptical mucronate glabrous 5 nerved at the base otherwise feather-nerved, nerves parallel nearly simple converging towards the point of the leaf, pedicels short stout axillary solitary 2 or 3 times longer than the petiole, 1 flowered, flowers rather large green, ovary smooth oblong furrowed, fruit size of a billiard ball, scarlet, warted, with 6 ridges.—*WA. Prod.* page 25. *Capparis divaricata*, *WA. Prod.* p. 27, and *Wight. Ic.* 889.

Very common both as a shrub and small tree all over the Coimbatore district, Madura, Salem, &c., and in the Dekhan; as a shrub it has a very narrow linear leaf only 1 line in breadth, and apparently never flowers in that state; as a tree the leaves are much broader; its wood is used as fuel.

Analysis is given of the flower of this species.

CAPPARIS GRANDIS, *Lin.*—A small tree, trunk thick tolerably straight but of no great height; branches numerous spreading. Thorns small stipular recurved or often wanting, leaves attenuated short petioled oval to ovate acute or obtuse or emarginate; when young covered with a greyish tomentum at length glabrous about 2 inches long and $1\frac{1}{2}$ broad; racemes terminal many flowered corymbiform, calyx of 4 unequal sepals, petals 4 oblong waved unequal very globose 2 seeded a little larger than a cherry.—*DC. Prod.* 1. p. 248. *C. maxima*, *Heyne DC.* 1. 248. *Capparis bisperma*, *Roxb. Fl. Ind.* ii. 568;—*Wight. Ic.* t. 21.

This tree is very common on the Eastern ghats of the Madras Presidency and on the Kurnool mountains, and is found sparingly in other parts all over the Presidency, and in Bombay, in the Godavery forests it is called Reggubi in Telugu, but I never heard Roxburgh's name of Guli given to it. The wood is hard, heavy, and durable, and is much used by the natives.

There are a good many other species of *Capparis*, but they are only straggling shrubs or climbers, or thorny hedge plants, and need not be recorded in this work.

CRATÆVA. LINN.

For *Gen. Char.* and description of *C. religiosa*, *Forst.* see letter press to the plates of that species.

2.—*CRATÆVA NURVALA*, *Ham.* A small tree or shrub, leaves trifoliate, leaflets ovate-lanceolate acuminate, lateral ones unequal at the base, limb of the petals ovate roundish, stamens numerous, torus hemispherical, berry ovoid.—*Ham. in Linn. Soc. Trans.* 15, p. 121;—*Rheed. Mat.* 3. t. 42.

A small tree or shrub common in Malabar, Mysore, and Bombay; it scarcely differs from *C. religiosa* (Roxburghii of *R. Br.*) except in the leaflets being ovate-lanceolate instead of obovate, and in the shape of the fruit. The leaves, bark, root and seeds are used medicinally by the natives; it is called Nirvalá in Malabar.

Analysis of Genera. Pl. II.

Dissections of the flower and ovary of *Capparis stylosa*.

MORINGACEÆ. (By Prof. Oliver.)

Flowers irregular, hermaphrodite, calyx 5-partite, with a short, cup-shaped tube and unequal imbricate, at length spreading or reflexed segments, Petals 5, similar in form to the calyx lobes, 2 upper smaller. Stamens 5, alternating with 5 staminodes or 10 declinate; filaments free, inserted in the margin of the disk; anthers 1-celled, dorsifixed. Ovary 1-celled, stipitate; style terminal, slender; ovules indefinite, anatropous, pendulous on 3 parietal placentas. Capsule siliquiform, 3-6 angled, 3-valved, many seeded. Seeds rather large, with or without wings, exalbuminous; radicle superior. Trees with 2-3 pinnate leaves, clustered at the ends of the branches; leaflets obovate or obovate-oblong, often caducous, or the leaves reduced to the jointed rachis. Panicles ample, hoary or glabrous, of rather large whitish pale yellow or red flowers. Capsules 6-20 inches in length.

A small and anomalous family of doubtful affinity, based upon the single genus. Confined to India, E. tropical Asia, and warm regions between.

MORINGA.

Juss. Benth. et Hook. f. Gen. Pl. 1. 430. *Char.* of the genus that of the order.

M. PTERYGOSPERMUM, *Gartn.* For description, vide letter press to the plate.

BIXINEÆ. (By Prof. Oliver.)

Flowers regular, hermaphrodite or 1-sexual. Sepals 3-8, free or united below, imbricate or rarely subvalvate in æstivation. Petals as many as the sepals or numerous or wanting, imbricate or contorted. Stamens hypogynous, indefinite; anthers 2-locular, dehiscing longitudinally or by terminal slits. Torus with or without a thickened disk. Ovary free, 1-celled or with the walls intruded so as to be spuriously multilocular; placentas usually 2-many, with many or few, more or less anatropous ovules. Fruit capsular or baccate, separating into as many valves as placentas or indehiscent. Seeds few or many, usually with fleshy albumen, and an axile, embryo with broad cotyledons. Trees or shrubs, sometimes armed with axillary spines. Leaves alternate, simple. Stipules minute or 0. Flowers axillary or terminal or from the old wood, solitary, fascicled, racemose or paniced, in some of the petaloid genera large and showy; in the dioecious genera insignificant.

An order represented by 8 Indian genera of trees but with the exception of *Hydnocarpus* not of much importance to the forester. *Cochlospermum* has only one Indian species, a tree with a soft worthless timber, but with handsome large yellow flowers of great beauty. *Bixa*, 1 species an introduced tree common in gardens. *Scolopia* several trees with generally very spiny trunks. *Flacourtia* 5 species usually spiny. *Hydnocarpus* 4 species, 1 of which is confined to Ceylon. *Erythrospermum*, *Aberia* and *Trichadenia* a single species each, and all confined to Ceylon. Little or nothing is known of the timber of the different species of *Scolopia* and *Flacourtia* or of the 3 last mentioned genera. *Bixa Orellana*, *Scolopia crenata* and *Hydnocarpus alpinus* will be figured in the plates; and dissections are here given of *Flacourtia*, *Erythrospermum*, *Aberia* and *Trichadenia*.

COCHLOSpermum. KUNTH.

Benth & Hook. Gen. Pl. 1. 124. Flowers hermaphrodite. Calyx of 5 unequal, imbricate sepals. Petals 5, large, contorted-imbricate in æstivation. Stamens indefinite, free, with oblong or linear anthers, opening by a short porelike slit at the apex, on the inner face. Ovary 1-celled, with 3-5 projecting, multi-ovulate placentas. Style undivided, slender. Stigma simple, obtuse or minutely toothed. Capsule somewhat papery, separating into 3-5-valves when ripe, each valve alternating with a corresponding valve of the submembranous endocarp. Seeds numerous, reniform or spirally twisted, covered or fringed with long cottony hairs; testa cellate, fascicled, racemose or paniced, either terminal or from the upper axils or from the old wood of the stock.

COCHLOSpermum Gossypium, *DC.*—A tree unarmed, trunk erect, bark smooth ash-coloured, leaves scattered about the ends of the branchlets 3-5 lobed, 2 to 8 inches long above pretty smooth, below covered with whitish down, the lobes entire acute, petioles as long as the leaves, stipules linear acute caducous, flowers terminal numerous paniced very large bright yellow, bracts stipule like, caducous, calyx 5 leaved leaflets oblong concave, petals 5 obliquely obovate, obliquely and deeply emarginate or rather cleft, spreading, filaments numerous short distinct anthers linear nearly as long as the filaments, style rather longer than the filaments but bent to one

side, stigma simple, capsule broad, turbinate sub-globular as long as a goose's egg, 5 lobed, seeds numerous kidney-shaped woolly.—*DC. Prod. 527. Bombax gossypium, Roxb. Fl. Ind. iii. p. 169.*

A tree very common on the mountains on the eastern side of the Presidency and about the dry slopes of the Nilgiris, Salem, Madura, Travancora, Mysore, &c. and in Bengal; its very handsome flowers appear in February or March when the tree is destitute of leaves; the timber is soft and valueless, and the cotton is of no value except for stuffing pillows, &c. The gum which exudes from the trunk is officinal. The tree is occasionally met with in gardens, and is well worth cultivating for the beauty of its flowers and foliage.

BIXA. LINN.

For Gen. char. and description of the species *B. orellana*, see letter press to plate.

SCOLOPIA. SCHREB.

For Gen. char. and description of *S. crenata* see letter press to the plate of that tree.

2.—*S. CHINENSIS, Clos.* A middling sized tree, trunk armed with large compound spines, branches generally unarmed, leaves oval obscurely serrated towards the apex $1\frac{1}{2}$ – $2\frac{1}{2}$ inches long, $1\frac{1}{2}$ broad, obscurely and very shortly acuminate at the apex, rounded or retuse, petioles $\frac{1}{2}$ inch long, berry size of a pea subglobose pulpy reddish black. *Clos. in Ann. des. Sc. Nat. Ser 4, VIII. p. 249*;—*Phoberos chinensis, Lour. Phoberos Arnottianus, Thw. En. Pl. Zey. p. 16 and p. 400.*

Introduced to South India and Ceylon from China.

3.—*S. GÖRTNERI, Thw.* A middling sized tree, trunk armed, leaves reticulated on both sides with prominent veins very variable in shape lanceolate to oblong, ovate or rotundate, cordate 1–2 inches long, by $\frac{1}{2}$ – $\frac{3}{4}$ in broad, sepals 10 rounded obtuse, berry subglobose size of a pea pulpy reddish black. *Thw. En. Pl. Zey. p. 17 and 400. Scolopia pusilla, Clos. l. c.*

Ceylon sea coast up to 1,500 feet called Katu Kurundo; the variety with lanceolate leaves may, Dr. Thwaites thinks, possibly be a distinct species. Wood hard, strong and elastic.

4.—*S. ACUMINATA, Clos. l. c.* A middling sized tree spiny when young, at length unarmed, leaves glabrous ovate-lanceolate with a long acumination, serrated towards the apex below the acumination narrowed at the base $2\frac{3}{4}$ in. long, $1\frac{1}{2}$ broad pale beneath, obscurely and finely venose, petioles 2–3 lines long sepals 10–12 broadly lanceolate, berry subglobose size of a cherry green firm and fleshy.—*Clos. l. c. Phoberos acuminatus, Gard. Thw. En. Pl. Zey. p. 17 and 400.*

Ceylon from 1,000 to 3,000 feet elevation.

5.—*S. CRASSIPES, Clos.* A very large tree, when young spiny, at length unarmed, leaves ovate sub-acuminate, narrowed at the base, margin slightly undulate $1\frac{1}{2}$ –2 inches long $\frac{3}{4}$ –1 inch broad, very coriaceous reticulated beneath with prominent veinlets, petioles scarcely 2 lines long, sepals 12–14 oblong, berry size of a cherry or larger green fleshy and firm.—*Clos. l. c. Phoberos Hookerianus, Wight MSS. Thw. En. Zey. p. 17 and 400.*

Ceylon 4,000 to 7,000 feet elevation.

6.—*SCOLOPIA WIGHTIANA.* A good sized tree, exceedingly thorny, leaves roundish ovate with a short obtuse acumination without glands at the base, scarcely serrate, the serratures often resembling mere glands, very coriaceous and hard, beneath somewhat prominently reticulated. *Flacourtia Wightianus, W. A. Prod. p. 30.*

Nilgiris.

ERYTHROSPERMUM. LAM.

Benth. and Hook. Gen. Pl. 1. 127. Flowers hermaphrodite, sepals 4–6 much imbricate, petals 5–6, stamens 5 inserted on to the torus which has no glands, anthers lanceolate-sagittate scarcely shorter than the filaments, connective dilated, ovary stipitate, placentas 3–4, many ovuled style short, stigma entire or 8–4 cleft, capsule 3–4 valved 1–few seeded, testa coriaceous, embryo slightly incurved. Trees or shrubs, leaves entire.

E. PHYTOLACCOIDES, Gard.—A middling sized tree 20–30 feet, branches glabrous terete, leaves alternate rather distant oblong lanceolate acuminate acute at the base, very glabrous on both sides shining above paler beneath entire or obscurely serrate reticulated with prominent veins, $3\frac{1}{2}$ –8 inches long, $1\frac{1}{2}$ –3 inches broad, petioles 3–8 inches long, sulcate above, swollen at the base and apex, stipules minute lanceolate, racemes many flowered paniculate terminal or axillary, about equalling the leaves, peduncles glabrous; pedicels 2–3 lines long, 3 bracteolate at the base, sepals 5 white tinged with red ovate obtuse concave about 2 lines long, petals white ovate-oblong obtuse ciliate when very young, equalling the sepals, anthers sagittate, ovary oblong glabrous stipitate capsule globose 3–5 lines in diameter, 3–4 valved nearly to the base, 1–few seeded.—*Gard. in Calc. Journ. of Nat. His. vol. vii, p. 11*;—*Thw. En. Pl. Zey. p. 18.*

Ceylon up to an elevation of 1500 ft.

FLACOURTIA. COMMERS.

Benth. and Hook. Gen. Pl. 1. p. 121.—Flowers dioecious or rarely bisexual, calyx 4–7 parted lobes sometimes unequal imbricate petals 0. Male flowers: stamens very numerous with small roundish or subdidymous 2-celled unappendaged anthers attached at the back and dehiscing longitudinally, ovary 0. Female flowers: stamens 0, ovary surrounded by an annular or interrupted disk, usually 4–8 celled with a pair of superposed ovules (the upper ascending the lower pendulous) in each cell, the upper and lower ovules separated at length by spurious dissepiments. Styles 4–8 more or less radiating persistent, stigmatic apices retuse or emarginate; bisexual flowers having the characters of both the male and female; fruit a berry 5–16 celled, seeds bony. Trees or shrubs frequently spinose with alternate simple leaves, flowers small in terminal or axillary racemes or fascicles or small panicles, or the female often solitary; fruit often edible.

FLACOURTIA RAMONTCHII, L'Hérit. Strip. Nov. 59, t. 30. 30 β.—A small glabrous tree or shrub or with the young parts and petioles obsoletely puberulous, frequently armed with acute, axillary ascending or spreading spines, 1–2 inches in length. Leaves shortly petiolate, glabrous at length shining, and when dry veiny above broadly elliptical or varying from obovate to oblong-elliptical; apex usually rounded and obtuse, sometimes broadly pointed; base rounded or more or less cuneate, broadly (sometimes obscurely) crenate or crenate-serrulate, 2–3 $\frac{1}{2}$ inches long, $1\frac{1}{2}$ – $2\frac{1}{2}$ inches broad, petiole 3–5 lines. Flowers 1–2 lines in diameter, in short few-flowered terminal racemes or terminating short lateral shoots. Fertile flowers perhaps usually solitary. Styles 5–7, very short, radiate, each longitudinally grooved above. Fruit a roundish, pulpy, edible berry, $\frac{1}{2}$ –1 in. diameter with about 10 seeds.—*Roxb. Fl. Ind. iii. p. 834. F. sapida, Roxb. l. c. p. 835.*

A native of various parts of the Presidency and in Bengal and Bombay, called Pedda Kauri and Kanregu in Telégoo, and Kanju in Hindostanee. The timber is straight and close grained, but too small to be of much use; it is sometimes used for ploughs and in turnery, and for carts; the fruit is eaten.

2.—*F. INERMIS, Roxb.* A middling sized tree, unarmed trunk short soon dividing into numerous branches forming a dense head, bark smooth brownish and without any thorns, leaves alternate short petioled elliptic smooth of a shining green on both sides and reddish when young, racemes axillary short, flowers hermaphrodite, calyx 4–5 parted, stamens about 20 inserted on to the annular disk which surrounds the base of ovary, ovary 5-celled with 2 ovules in each attached to the middle of the axis, style 5–6 radiating, berry size and appearance of a red cherry and very smooth, seeds as far as 10.—*Roxb. Fl. Ind. iii. 833.*

Found in many parts of the Madras Presidency, but perhaps introduced; the tree is very ornamental, the fruit is eaten and makes good tarts; the tree flowers in the hot weather, and ripens its fruit in September. I know nothing of its timber; it is called Ubbolu in Canarese.

3.—*F. CATAPHRACTA, Willd.* A middling sized tree, trunk short armed with numerous large decomposed thorns, bark pretty smooth, branches numerous, generally unarmed except close to the trunk, leaves alternate short petioled ovate oblong serrulate smooth shining green on both sides 2–3 inches long, racemes axillary small 5–10 flowered, a small cordate bract below each pedicel, male calyx 4–5 parted stamens inserted into a glandular convex receptacle, female calyx of 4–6 spreading sepals with an annular lobed disk surrounding the ovary, styles 4–6 radiating, berry size of a common plum globular smooth purple succulent 8–12 seeded, seed hard sharp edged.—*Roxb. Fl. Ind. iii. p. 834.*

Malabar, South Canara and Bombay; the fruit is edible.

4.—*F. SERPENTARIA, Roxb.* A shrub with large simple thorns which are often leaf and flower bearing, leaves obovate or round serrate smooth, peduncles axillary and terminal; berries size of a pea about 5-seeded.—*Roxb. Fl. Ind. iii. p. 835*;—*Rheed Mall, v. t. 39.*

A common shrub throughout the Madras Presidency, Bengal and Bombay, called in Telugu Kanru; it is of no use except for firewood.

5.—*F. MONTANA, Graham.* A middling sized tree with an armed trunk, young shoots with axillary thorns, leaves ovate oblong crenate, fruit scarlet of the size of a large cherry.—*Dalz. Bombay Flora. p. 10.*

Common on the Bombay ghats; native name Attak; the fruit is agreeable and slightly acid.

ABERIA. HOCHST.

Flowers dioecious, sepals 5–8 imbricate, petals 0. Male flower: stamens indefinite, anthers shortly oblong introrse dehiscing longitudinally, rudiment of an ovary none or very small, no hypogynous disk. Female flowers: calyx as in the male persistent, stamens 0, ovary seated on an hypogynous crenulated disk, placentas 5–7 (2 ovulate) very prominent and nearly meeting in the centre, and so forming a 5–7 celled ovary, styles as many as the placentas, berry 1–6 celled, seeds 1–6 attached to the walls of the cavities. Small trees with or without spines, leaves alternate simple, fruit edible.

ABERIA GARDNERI, Clos. A middling sized tree 16–20 feet, unarmed, branches terete tuberculate, young ones tomentose, leaves ovate oblong or oblong lanceolate acuminate subobtuse at the base, entire or dentate serrate, above pubescent, beneath tomentose, about 4 inches long by 2 broad, petioles about 4 lines long, costa and primary veins reddish, male peduncle short often twin, pedicels 10–20 umbellate about 4 lines long pubescent, calyx lobes lanceolate acute pubescent, filaments filiform equalling the segments of the calyx, female pedicels 1–3, calyx lobes as in the male, ovary densely pubescent subglobose, styles diverging $1\frac{1}{2}$ lines long pilose, berry about 1 inch in diameter.—*Clos. in Ann. des Sc. Nat. ser. 4. viii. p. 236. Rounea hebecarpa, Gard. in Calc. Journ. of Nat. His. vol. vii. p. 9*;—*Thw. En. Pl. Zey. p. 18 and p. 400.*

Ceylon, called Katambilla; the acid fruit is eaten.

TRICHADENIA. THW.

Flowers dioecious, calyx gamosepalous entire calyptriform at length irregularly cleft, petals 5, hypogynous imbricate, squamules 5 lanceolate opposite to the petals fleshy hirsute. Flowers male, stamens 5 alternate with the petals, spirally contorted in aestivation, filaments thick slightly pilose at the base, anthers oblong dehiscing longitudinally, rudiment of ovary none. Flowers female, staminodia none, ovary sessile free 1 celled, placentas 3, 1 ovuled, ovules suborthotropical horizontal; styles 3 diverging, stigmas broad reniform crenate, berry spherical 1–3 seeded, testa long, embryo orthotropical in the axis of the fleshy albumen, radical short cylindrical, cotyledons foliaceous plicato rugose. A tree, leaves penninerved, stipules foliaceous caducous, panicles axillary.—*Thw. in Hook. Kew Journ. vii. 196.*

TRICHADENIA ZEYLANICA, Thw. A large tree, young branches tomentose, leaves alternate petioled, oblong penninerved coarsely dentate or sinuate towards the apex, narrowly acuminate at the apex, rounded at the base, 5–12 inches long by 2–4 broad, petioles 2–3 inches long, stipules foliaceous concave caducous, panicles racemiform axillary shorter than the leaves, flowers 6 lines broad, pale green, fruit globose 9–11 inches in diameter.—*Thw. Hook. Kew Journ. vii. 196, t. 5*;—*En. Pl. Zey. p. 19.*

Ceylon, at an elevation of about 3000 feet, not uncommon, called Tatti. The oil extracted from the seed is used for diseases of the skin.

HYDNOCARPUS. GÖRTN.

For Gen. char. and description of *H. alpinus*, see letter press and the plate of that species.

2.—*H. WIGHTIANA, Bl.* A middling sized tree, young branches glabrous or slightly silky with golden pubescence as is the inflorescence, leaves elliptic oblong, acutely serrate 5–7 inches long by $1\frac{1}{2}$ –2 inches broad, peduncles axillary subracemose few flowered, sepals unequal, the 3 inner ones longer, petals broad ovate fringed with soft white hairs, scales broad ovate about $\frac{1}{2}$ the length of the

petals densely hairy, stamens as long as petals, filaments subulate, anthers broad reniform, pistil none; female as in the male, anthers sterile, placentas corresponding in number to the lobes of the stigma, fruit obtusely angled.—*Bl. in Rhumphia* iv. p. 22. *Hydnocarpus inebrians*, *Wight Ill. t. 16 and p. 37*; and *W.A. Prod. p. 30*—(not *Vahl*.)

A very common tree in the plains of Malabar and all the ghat forests on the western side of the Presidency, up to about 2000 feet elevation; it is called Maravetti in Tamil, and on the Anamallays the Kaders call it Yetti maram; the fruit is used to intoxicate fish; the wood is used for various purposes by the natives; it differs from the true inebrians with which Dr. Wight has confounded it, in the fruit being obtusely angulate, and in the flowers being subracemose instead of cymose. I find however that the young ramuli of this species are generally silky, and the stipules are not as persistent as Dr. Wight's figure would lead one to believe.

3.—*H. INEBRIANS*, *Vahl*. A large tree, young branches rufo-tomentose, leaves lanceolate acuminate obtusely serrate or subentire, more or less narrowed at the base, suboblique, sepals rounded, petals rounded ciliate $1\frac{1}{2}$ lines long, scales rounded acuminate ferrugineo-strigose, berry about 1 inch in diameter subtorulose ferrugineo-tomentose at length black.—*Vahl. Symb. Bot. iii. p. 100*. *H. venenata*, *Gärtn. Fruct. et Pl. l. p. 288. tab. 60*. *Marotti, Rheed. Hort. Mal. l. p. 65. t. 36*;—*Thw. En. Pl. Zey. 18*.

Malabar coast, bearing the same name as the preceding species, and possessing the same qualities. Ceylon, up to 2000 feet, called Makula. The oil extracted from the seed is used in cutaneous complaints.

4.—*H. OCTANDRA*, *Thw*. A middling sized tree 40-50 feet, bark smooth, young branches strigose tomentose, leaves alternate entire suboblique pinnately veined ovate lanceolate narrowed at both ends, obtusely acuminate $3-4\frac{1}{2}$ inches long by $1\frac{1}{2}-1\frac{1}{4}$ broad, glabrous above, furnished with black glandular dots beneath and hairy on the costa, petioles $\frac{1}{2}-\frac{3}{4}$ inch long, inflorescence stellately pubescent axillary fascicled, fascicles 2-8 flowered, flowers 5 lines broad, pedicels 3-4 lines long, sepals 5 oblong obtuse concave unequal, petals 5 rounded concave ciliate with white silky hairs, scales 5, opposite the petals and $\frac{1}{2}$ their length, rounded obtuse or minutely apiculate sericeous; flowers male; stamens 8 in 1 series surrounding the rudiment of an ovary, filaments subulate, anthers adnate oblong; flowers female, anthers sterile, ovary oblong strigose, placentas parietal 4; style none, stigma large 4 parted, berry spherical tomentose $1\frac{1}{2}-2\frac{1}{2}$ inches in diameter, seeds 4-12 or more oblong 10 lines long 5 lines broad immersed in soft pulp.—*Thw. in Hook. Kew. Journ. of Bot. vol. vii. p. 197*, and *En. Pl. Zey. p. 19*.

Ceylon in the Ambagunwa district, elevation about 2500 feet.

Analysis of Genera. Pl. ii. *Rizineae*.

4. *Flacourtia inermis*, dissections of the hermaphrodite flower.
- Flacourtia sapida*, female flower; and young fruit cut transversely.
5. *Aberia Gardneri*, dissections of male and female flowers.
6. *Erythrospermum phytolaccoides*, dissections of flowers and fruit.
7. *Trichadenia Zeylanica*, dissections of flowers and ovary, shewing a flower bud with the calyx bursting irregularly; a male flower and female flower, a single petal and an ovary cut horizontally.

PITTOSPOREÆ. (By Prof. Oliver.)

Flowers regular, hermaphrodite. Sepals 5, free or slightly connate below, aestivation imbricate. Petals 5, exceeding the sepals free or connate below, more or less spreading above, aestivation imbricate. Stamens 5, hypogynous, free, alternate with the petals; filaments filiform or linear; anthers dehiscing longitudinally unappendaged. Ovary 2 rarely 3-5 celled or 1 locular with parietal placentas and indefinite ovules. Style simple, terminal; stigma minute or capitate, entire or toothed. Fruit a coriaceous capsule dehiscing loculicidally in two valves each bearing a septum on the middle. Seeds albuminous, with a minute embryo, testa smooth or rugose. Trees, shrubs or undershrubs. Leaves alternate simple entire wavy or toothed, exstipulate. Inflorescence various. An unimportant order containing 3 small trees all belonging to the genus *Pittosporum*.

PITTOSPORUM. BANKS.

Sepals free or slightly united at the base. Petals more or less spreading above, free or connivent or coherent into a tube below. Filaments subulate; anthers erect, ovate oblong. Ovary nearly or quite divided into 2 (rarely 3 or 5) cells by the projecting placentas. Capsule coriaceous or rather woody, globose or obovoid, dehiscing in two entire septiferous valves. Seeds various in form from nuptial pressure, often imbedded in viscous fluid.

PITTOSPORUM FLORIBUNDUM. *WA.* A small tree, leaves thinly coriaceous glabrous elliptic lanceolate to oblongo-lanceolate, subacute or rounded at the apex, margin waved, 3-4 inches long, racemes terminal aggregated many flowered compact, flowers white small, peduncles glabrous, pedicels glabrous somewhat umbellate, sepals minute many times shorter than the corol ovate acute concave ciliate at the apex, petals linear, ovary hairy, style cylindric glabrous, stigmas 2 lobed, ovules 4-6 in each cell of the ovary, capsule size of a pea, nearly black when ripe 2 valved compressed 3-4 seeded, valves thinish, inside transversely wrinkled.—*WA. Prod. p. 154*. *P. zeylanicum*, *Wight Ill. l. 173*; and *Thw. En. Pl. Zey. p. 68*. *Celastrus verticellatus*, *Roxb. Fl. Ind. i. 391*.

Common along all the Western ghats of the Madras Presidency up to 4000 feet elevation, and in Ceylon; called Yekkadi in Bombay, and Katteya in Ceylon; also found in Nepal; the timber is strong and tough but of small size.

2.—**P. TETRASPERMUM.** *WA.* A small tree or large shrub, leaves elliptic oblong acute coriaceous glabrous margins slightly waved and recurved, flowers in a terminal sessile umbel, peduncles aggregated into a terminal sessile umbel, usually 1, rarely 2 flowered pubescent, sepals pubescent lanceolate acuminate minute many times shorter than the corol, petals linear, ovary hairy, style glabrous, stigmas 2 lobed, ovules 2 in each cell, capsule nearly globose, when mature compressed 4 seeded, valves thick coriaceous.—*WA. Prod. p. 154*.

Ootacamund and Ceylon, 5000-7000 feet elevation; flowers in February and March.

3.—**P. NEILGHERRENSE.** *WA.* small tree or shrub, leaves thinly coriaceous elliptic lanceolate glabrous, racemes terminal 2-3 together 1-4 flowered lax, peduncles glabrous, pedicels glabrous slender alternate, sepals minute many times shorter than the corol, lanceolate acuminate flat glabrous slightly ciliated, petals linear, ovary hairy, style glabrous, stigma 2 lobed, ovules 4-6 in each cell, capsule yellowish green when mature compressed, 2 valved 4-6 seeded, valves thick between fleshy and coriaceous.—*WA. Prod. p. 154*. Nilgiris; the flowers and fruit are much larger than in floribundum.

Analysis of Genera. *Pittosporaceæ* Pl. II.

Fig. viii., dissections of flowers and fruit of *Pittosporum tetraspermum*.

