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CSL

PART XI

THE

FLORA SYLVATICA

FOR

SOUTHERN INDIA:

CONTAINING QUARTO PLATES OF ALL THE PRINCIPAL TIMBER TREES IN SOUTHERN INDIA AND CEYLON, ACCOMPANIED BY A BOTANICAL MANUAL, WITH DESCRIPTIONS OF EVERY KNOWN TREE AND SHRUB, AND ANALYSIS OF EVERY GENUS NOT FIGURED IN THE PLATES.

BY

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Madras.

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FERONIA ELEPHANTUM. (Nat. order Rutaceæ.)

FERONIA. *Correa*.—GEN. CHAR. Flowers polygamous by abortion, calyx small 5 toothed, teeth deciduous, petals 5 rarely 4-6 patent oblongo-lanceolate imbricate with incurved tips, stamens 10-12 (sometimes a few imperfect ?) filaments dilated at the base, apiculate at the apex, inserted below the torus, anthers linear-oblong, torus a short soft woolly bed, style none, stigma large oblong 5 lobed, ovary oblong 1 celled, placentas 5-6 parietal, ovules numerous crowded in many series, berry globose woody 1 celled, many seeded, filled with pulp, seed oblong compressed, cotyledons thick fleshy. A thorny tree, leaves unequally pinnate, flowers racemose or panicled ; fruit large woody, pulp edible.

FERONIA ELEPHANTUM. (Corr.) A large tree, leaves unequally pinnate 2-4 inches long quite glabrous, leaflets 5-7 almost sessile lanceolate to obovate quite entire or slightly crenulate towards the apex, furnished with glandular dots, petioles slightly winged, panicles short axillary or terminal or from nodes in the old axils, puberulous, flowers small dull reddish colored, petals ciliate at the apex, in the male flower there is a small abortive ovary and 5 lobed stigma and generally 11-12 fertile stamens, in the hermaphrodite the stamens are fertile generally 10, the filaments in the male are rather shorter and less apiculate than in the hermaphrodite, (I have never observed imperfect stamens in either sex.) Fruit as large as a billiard ball, hard and woody with a greyish rind, seeds immersed in fleshy edible pulp. *DC. Prod. Vol. i. 538.*

This tree is common throughout India and in Ceylon, it is universally known as the Wood-apple, in Telugu it is called Velagà and Elakà ; Kawet in Hindustanee ; Velà in Tamil ; Bilwâr in Canarese ; and Diwool in Ceylon : the wood is hard, strong, heavy and durable, and is used for various purposes. A gum exudes from the trunk, which is much like the gum Arabic, the pulp of the fruit makes a pleasant jelly, and the leaves are used medicinally by the natives. The tree flowers in February and March, it is much cultivated throughout India, it is the only species of this genus.

Fig. i. fertile flowers.

Fig. ii. male flowers.



Gouraudon, del.

Terminalia elephantum, (Corr.)

Dunphy, Lith.



AILANTHUS MALABARICA. (Nat. order Simarubææ.)

AILANTHUS. *Desf.*—**GEN. CHAR.** Flowers polygamous, calyx small 5 lobed, lobes equal imbricate, petals 5 patent valvate or slightly imbricate at the sides with the tips incurved, disk 10 lobed, stamens 10 in the male flowers, (10 or fewer or none in the female or hermaphrodite) inserted at the base of the disk, filaments very short or filiform without scales, ovary of 2-5 carpels more or less connate (rudimentary in the male flowers) carpels compressed 1 celled, styles as many as the carpels consolidated into 1 with plumose stigmas, often more or less distinct towards the base, ovules solitary in each cell attached to the ventral suture below the apex, fruit of 1 to 5 oblong membranous samaræ thickened in the centre round the single seed, seed flattened, suspended, testa membranaceous, albumen scanty, cotyledons leafy nearly orbicular, radicle short superior. Large trees, leaves alternate pinnate, leaflets many pair, flowers small in terminal panicles.

AILANTHUS MALABARICA. (DC.) A lofty tree, bark rough and often studded with bright reddish grains of resin, leaves equally pinnate, quite glabrous 15-20 inches long, leaflets 6-10 subopposite or opposite pair commencing a little above the base of the petiole, semiovate from a very unequal base gradually attenuated into a long acumination, glabrous on both sides, shining above, very pale beneath, (veins pinnate forked and looped near the margin) 3-7 inches long by 1-1½ broad, petiolules 2-4 lines long; panicles axillary much branched nearly as long as the leaves and occasionally leafy at the base of the lowest ramification, slightly puberulous or glabrous, calyx slightly puberulous and ciliate, petals slightly imbricate at the edges and with incurved tips, male flowers smaller than the female, disk 10 lobed with a minute 3 lobed rudiment of an ovary in its centre, stamens much exerted, much longer than the corol, anthers oblong attached by the centre of the back; female flowers with 10 sterile stamens alternately shorter, all much shorter than the corol, anthers sterile saggitate basifixed, disk large irregularly lobed or warted. Samara 3-3½ inches long by 10-13 lines broad. *DC. Prod. ii. p. 89. Pongelion, Rheed. Mal. 6. t. 25.*

A very lofty tree, common in the dense moist forests of the Western ghats of the Madras Presidency (up to 3,000 feet) from S. Canara down to Cape Comorin, also in Ceylon; in S. Canara it is called Doop or Baga Doop, matti pâl on the Annamullays, and Kumbaru or Wal biling in Ceylon, in Travancore the tree is commonly planted, and is very ornamental, a fragrant resinous balsam (known as mutti pâl) exudes from the trunk, reduced to powder mixed with milk and strained it is given by native doctors in dysentery and said to be a first rate remedy, the bark has a pleasant slightly bitter taste and is used medicinally by the natives as a febrifuge and tonic. Mr. Broughton has favored me with the following report on some of the resin submitted to him for analysis.

"This resin as commonly met with is dark brown or grey in color, is plastic, opaque and has an agreeable smell. It contains much impurity. The pure resin is very soft, having the consistence of thick treacle, and this is doubtless the reason why it is always mixed with fragments of earth which makes it more easy to handle. The sample which I examined contained but 77 per cent. of resin, the remainder being adulterations. Alcohol readily dissolves the resin, and on evaporation leaves it as a very viscus, transparent light brown semi-liquid which does not solidify by many days exposure to a steam heat. When burnt it gives out a fragrance, and hence it is sometimes used for incense. Its perfume is however inferior to that produced by many other resins employed in the concoction of the incense employed in Christian and Heathen worship. The peculiar consistency of the resin would enable it to substitute Venice turpentine for many purposes. A substitute for Venice turpentine in India is mentioned as a desideratum in the reports of the Juries of the Madras Exhibition of 1855, class IV."



Govindoo, det.

Ailanthus Malabarica (D.C.)

Thurbergh, Libt.



ODINA WODIER. (Nat. ord. Anacardiaceæ.)

ODINA. *Roxb.*—GEN. CHAR. Flowers polygamous. Calyx 4-5 fid or partite; segments ovate or roundish. Petals as many, imbricate. Disk small, annular or saucer-shaped. Male flowers, stamens 8 or 10, inserted under the margin of the disk; anthers versatile or subversatile. Rudiment of ovary usually 4 fid. Fertile flowers, anthers smaller often effete. Ovary sessile, free, glabrous or hairy, 1 celled. Styles 4 or 3, short, distinct, rather stout; stigmas terminal. Ovule solitary, pendulous. Drupe oblong or ellipsoidal, compressed. Embryo with flat fleshy cotyledons. Trees or shrubs. Leaves alternate, deciduous, unequally pinnate, usually collected at the extremities or in lateral tufts from nodes of a previous year; leaflets opposite, entire. Flowers racemose, often fasciculate, shortly pedicellate or subsessile. *Roxb. Fl. Ind.* ii. 293. *Lansea, Guill. and Perr. Fl. Seneg.* 1. 153.

ODINA WODIER. (*Roxb.*) A large tree, trunk of no great height to the branches, but thick and tolerably straight, bark pretty smooth ash colored, branches numerous, the lower spreading the upper ones disposed in every direction generally leafless at the time of flowering, leaves alternate about the ends of the branchlets unequally pinnate 10 to 18 inches long, leaflets about 5 opposite pair (with an odd one) on the upper half of the common petiole; sessile or subsessile ovate to oblong often oblique at the base entire with a longish blunt acumination, when young more or less covered with white stellate wool at length quite glabrous, 2-5 inches long by 1-2 inches broad; inflorescence terminal the male on long filiform paniced spikes, the fertile on short racemes both covered with stellate rather scaly pubescence, flowers tetramerous very small, male and fertile on the same tree or on different trees, calyx slightly hairy, in the male there are 8 fertile stamens on long filaments inserted under the 8-9 lobed disk, in the centre of which is the rudiment of an ovary terminating in a style with a star-like 4 cleft apex, in the female there are 8 sterile anthers on short filaments a large ovary crowned with 4 short stout distinct styles, stigmas more or less 2 cleft, drupe kidney-form smooth, red when ripe, the size of a small olive.

This tree is common in most of our jungles and is found in Bengal, Bombay and Ceylon, and is also abundant everywhere in this Presidency in a planted state, particularly as an avenue tree, but the cultivated trees are generally grown from cuttings and are gnarled ugly specimens; it is the worst possible avenue tree as it is bare of leaves for several months in the drier and hottest time of the year; it is called Gumpini and Dumpini in Telugu, Wodier and Wude in Tamil, Shimtee and Poonil in Canarese, and Hig or Hok in Ceylon, it seldom ascends the mountains to any elevation, but is found all over the Mysore plateau at 3,000 feet; the outer wood is white and worthless, but the heart wood of good seedling trees which is of a deep reddish mahogany, is useful for many purposes and would be excellent for cabinet purposes and furniture, the tree is lopped for fodder and a gum exudes from the trunk which is used medicinally by the natives, being given in asthma and as a cordial and used as a plaster and also in cloth printing, the tree inhabits Birmah, where it is called Nabhay and the timber is in use for sheaths of swords, spear handles, oil presses and rice pounders, and a closely allied species is found in tropical Africa.



Guerrido, Del.

Odina nodosa (Poir.)

Dunphy, Lith.

12034

BOSWELLIA GLABRA. (Nat. order Burseraceæ.)

BOSWELLIA. *Roxb.*—GEN. CHAR. Flowers regular hermaphrodite. Calyx small 5-7 toothed persistent, petals 5-7 spreading imbricate, stamens 10-13 alternately shorter inserted under the fleshy annular undulate or crenate disk, ovary sessile narrowed into a short style 3 rarely 4 celled, stigma 3-4 lobed or entire, ovules 2 in each cell collateral attached to the axis above the middle, fruit 3 rarely 4 angled coriaceous, the epicarp separating in 3-4 valves from as many bony 1 seeded pyrenes which are persistent to the central axis, seed compressed pendulous with a membranaceous margin, testa membranaceous, cotyledons multifold contortuplicate or quite flat, radicle superior. Trees abounding with resin, bark deciduous in papery or membranous laminae, leaves deciduous crowded at the apex of the branches, alternate, unequally pinnate, exstipulate, leaflets opposite serrate, racemes or panicles axillary or collected at the ends of the branches, appearing before the leaves, flowers white. *Roxb. Pl. Corom. iii. 4. t. 207. Libanus, Coleb. in As. Res. 9. 377 t. 5. f. 1. Plæssia, End. Nov. Stirp. Dec. 39.*

BOSWELLIA GLABRA. (*Roxb.*) A good sized tree with a greenish smooth bark, leaves alternate towards the apex of the branches unequally pinnate, about 1 foot long, the petiole very slightly puberulous or glabrous, leaflets 6-10 opposite or subopposite pair, with a terminal odd one, sessile or subsessile, glabrous on both sides, from quite entire to distantly serrated often only towards the apex, lanceolate obtuse about 2½ inches long, by 10-12 lines broad, racemes terminal, or from the upper axils rather crowded, slightly puberulous, calyx puberulous or subglabrous 5-6 or occasionally 7 cleft, petals 5-6 occasionally 7 slightly puberulous on the back, anthers hairy 10-12 occasionally 13, ovules 2 in each cell collateral attached to the axis above the middle, stigma 4 lobed, pyrenes (not quite mature) heart-shaped with a long beak at the apex (at length winged ?), cotyledons flat or contortuplicate trifid, lobes again variously cut or entire, radicle superior long. *Roxb. Fl. Ind. ii. p. 384.*

This fragrant resin-bearing tree is very common in many of our dry subalpine jungles, particularly on the eastern side of the Presidency, on the Vellore, Cuddapah, North Arcot and Kurnool hills, Mysore, Guzzlehatty pass, &c. &c.; it does not occur in Ceylon, it flowers in January and February generally when quite destitute of leaves, the gum resin is the olibanum of commerce and is known to the natives as Koondricum, it is much used as a fragrant incense and (when boiled with oil) as pitch, and is also said to possess stimulant astringent and diaphoretic properties, it is largely used in some parts of India as an application to indolent sores and is supposed to form the chief ingredient in "Wroughton's ointment," it is well deserving of careful attention and can be procured in almost any quantity, the substance is bitter and pungent and is soluble in ether and spirits of wine; in Tamil the tree is called Kungli and Googoolu and Telugu Anduga. I am not acquainted with its timber, but it is said by the natives to be of little or no value.

Analysis.

The drawing is from fresh specimens collected on the Nilgiri slopes, the analysis is from 5 merous flowers (which are most common) but the sepals and petals are sometimes 6-7 and the stamens 12-13.

- Fig. i. is a fruit opened, showing the heart-shaped pyrene or nut.
- Fig. ii. A nut cut vertically, showing the embryo with unfolded trifid cotyledons (they are sometimes folded.)
- Fig. iii. An embryo opened out showing more cut cotyledons than in fig. ii.



Gouveia, del.

Boswellia glabra (Roel.)

Dumort., lith.



PROTIUM CAUDATUM. (Nat. ord. Burseraceæ.)

PROTIUM, *Wight and Arot.*—GEN. CHAR. Flowers polygamous, calyx small tubular 4 cleft or dentate, lobes valvate; petals 4 erect, with the apex recurved and the tips incurved, linear oblong slightly imbricate at the sides with the tips incurved in aestivation; disk urceolate 4 lobed lining the bottom of the calyx, margin free, stamens 8-10 inserted below the margin of the disk on the outside alternately shorter, erect free shorter than the calyx in the fertile flower, much longer than the calyx in the sterile flower, the longer ones rising from the back of the lobes of the disk and the shorter ones from or behind the sinuses; ovary sessile 2-4 celled, style very short or obsolete, stigma 3-4 lobed, ovules 2 in each cell collateral pendulous from the apex of the axis, drupe fleshy globose, sarcocarp at length 4 valved with 1-4 bony 1 seeded pyrenes which are connate at first but at length separating, seed oblong, testa membranaceous, cotyledons membranaceous contortuplicate, radicle superior. Small trees without thorns, bearing resin; leaves alternate towards the apex of the branches, 3 foliate or unequally pinnate, panicles long peduncled crowded towards the apex of the branches, flowers small. *WA. Prod. p. 176.* *Protionopsis, Bl. Mus. Bot. 1. 229.*

PROTIUM CAUDATUM. (WA.) A middling sized tree, bark very smooth and of a bright green color, leaves alternate about the extremities of the branches 3-foliate or unequally pinnate, 3-6 inches long, leaflets 1 to 5 pair with an odd one, quite glabrous on both sides, from broadly ovate to lanceolate with a long terminal sharp acumination, about 2 inches long by 1/2-1 inch broad, petiolules 2-4 lines long, panicles fascicled supra axillary from the young shoots; about equal in length to the young leaves but shorter than the adults, 2-3 times dichotomous, lax, furnished with filiform apiculate bracteoles (2-3 lines long) at the base of the ramifications; petals reflexed but with an incurved tip at the apex, stamens 8 alternately shorter inserted below the margin of the disk on the outside, shorter than the calyx in the fertile flowers, much longer than the calyx in the sterile, the anthers of the shorter filaments apiculate the others rounded, ovary oblong 2 celled, ovules 2 in each cell collateral pendulous from the apex of the axis, stigma subsessile 3-4 lobed, in the male flowers there is a small abortive ovary with a 3 lobed sessile stigma, drupe the size of a small sloe. *WA. Prod. p. 176.*

This green barked tree is common in most of our dry subalpine jungles on both sides of the Madras Presidency, and is found in Ceylon all over this Presidency; it is very common as an avenue tree, and a very bad one it makes, as it is bare of leaves for some months towards the end of the cold season and beginning of the hot, the young leaves appearing with the flowers in March. It is curious that it is not mentioned by Roxburgh as it is so abundant in some parts of the Northern Circars; it is called Kondâ Mâmidi in Telugu and Kilevay in Tamil; the whole tree is very odoriferous, the leaves and bark having a strong grateful fragrance something like mangoes. The tree grows most readily from large cuttings, which is the reason it is so often employed for avenue purposes; the wood is said to be worthless.

The figure is from a drawing executed in the Ceylon Herbarium, and represents fertile flowers. My S. Indian specimens quite tally, except that the leaflets are broader and fewer in number, the stigma generally (always?) 3 lobed, and the ovules pendulous instead of ascending; the latter difference is an error of the Ceylon artist. I have added (figure A.) dissections of the male flower taken from fresh specimens collected in this Presidency.

The South Indian species of Protium and the S. Indian Balsamodendron, must be placed under the same genus; the flowers only differ in the former having a 4 lobed disk and the latter a 6-8-crenated disk, and there is no difference in the fruit; the 2 species of Protium are unarmed with long peduncled panicles. Balsamodendron is armed, and has almost sessile inflorescence, but this would not constitute a generic distinction, and the genus Protium of WA. must lapse.



Corredon, del.

Protium caudatum (W.)

Dierapf, T. lict.



BALSAMODENDRON BERRYI. (Nat. ord. Burseraceæ.)

BALSAMODENDRON, *Kunth*.—GEN. CHAR. Flowers polygamous. Calyx tubular 4 toothed persistent, petals 3-4 erect recurved towards the apex with incurved tips, linear-oblong, the sides slightly imbricate and tips incurved in æstivation, stamens 6-8 inserted outside the margin of the very short 6-8 crenated disk, free, alternately shorter, ovary surrounded by the disk sessile 2-3 celled, narrowed into a longish style, stigma obtuse 4 lobed, ovules 2 in each cell, collateral pendulous, in the male flowers the ovaries are abortive very small or sometimes wanting. Drupe ovoid or subglobose, epicarp 2-4 valved, with 1-3 bony 1 seeded pyrenes, seeds exalbuminous, testa membranaceous, cotyledons contortuplicate sheathing the terete pointed superior radicle. Trees or shrubs yielding resin, generally spinose, leaves alternate 1-3 foliate or unequally-pinnate, flowers small fascicled on thickened nodes or short lateral ramuli or on 1-4 flowered axillary jointed peduncles. *Kunth. in Ann. Sc. Nat.* ii. 348. Heudelotia, *A. Rich. Fl. Seneg.* 150. t. 39. Commiphora, *Jacq. Hort. Schœnb.* t. 294. Balsamophleos, *O. Berg. in Bot. Zeit.*

BALSAMODENDRON BERRYI. (*Arnt*.) A small or middling sized very thorny tree up to 3-4 feet in girth with numerous lateral spinose ramuli nearly at right angles with the branches, leaves more or less fascicled at the extremities or from nodes on the branches or thorn-like ramuli, trifoliate 1-1½ inches long, common petiole ½ an inch long channelled slightly puberulous, leaflets sessile or subsessile at the apex of the petiole cuneate obovate, the terminal one twice as large as the lateral ones, glabrous on both sides from entire or slightly undulate to more or less crenate particularly towards the apex, flowers very small (about 3 lines long) fascicled on nodes on the branches and thorn-like ramuli sessile or subsessile, calyx tubular 3-4 cleft at the apex, corol twice or nearly twice as long as the calyx 3-4 petaled, petals slightly imbricate at the sides with inflexed tips during æstivation, erect in expansion with a recurved apex which terminates in an incurved tip, disk very small (generally rather larger in the male flowers than in the fertile) 6-8 crenated, the crenatures resembling glands, stamens 6-8 alternately shorter, in the male all are very much longer than the calyx and the 3-4 longer ones equal the corol, the anthers of the longer are rounded or subapiculate, and prominently apiculate on the shorter, in the fertile flowers the 3-4 longer ones equal the teeth of the calyx and the others the sinuses only, the anthers are smaller, (and effete?) ovary large in the fertile flowers attenuated into a rather long style with a 4 lobed stigma, very small (or wanting) in the male flowers, stigma 4 lobed, fruit as in the genus oblong sometimes obtusely angled 6-8 lines long apiculate. *Arnot Ann. of Nat. Hist.* vol. iii. p. 85, 86;—*Wight, Ill.* p. 185. Protium Gileadense, *WA. Prod.* 176. (exc. syn.) Amyris Gileadensis, *Rowb. Fl. Ind.* ii. p. 246 (exc. syn.)

This is a good sized tree in the dry jungles to the east of the Nilgiris (Guzzehaty pass, &c.) covered with flower and fruit in February and March, all over the Presidency it is very common as a hedge plant but seldom flowering in that state, as the inflorescence is either attacked when young by some insect or rendered abortive from a successive propagation from cuttings. The whole tree has a grateful fragrance and a gum-resin exudes from it, the plant makes an admirable hedge.

I have taken the generic character entirely from the Indian plant, the drawing is from fresh specimens collected in the Coimbatore district.



Carandoo, del.

Balsamodendron Bergii (Ait.)

Dampney, Lith.



CANARIUM BRUNNEUM. (Nat. ord. Burseraceæ.)

CANARIUM, *Linn.*—GEN. CHAR. Flowers hermaphrodite or polygamous, calyx urceolate or cupulate 3-5 cleft (rarely only 2) valvate persistent, petals 3-5 as long or longer than the calyx, valvate or imbricate, stamens 8-10 short erect or incurved (6 in some extra-Indian species) inserted on to a long staminal tube, disk obsolete or none, or on the margin or outer side of a fleshy entire or undulate disk, filaments cohering more or less together at the base and with the disk; ovary ovoid 2-3-4 celled, ovules 2 in each cell collateral fixed to the axis, stigma sessile or subsessile, capitate 3-4 lobed, drupe ovoid or ellipsoid often 3 sided with a bony 1 seeded putamen, testa membranaceous, cotyledons contortuplicate, radicle short straight superior. Large trees yielding resin, leaves alternate pinnate with or without stipules, the lowest pair of leaflets occasionally resembling stipules, leaflets opposite entire or crenulate, panicles axillary, flowers small.—*Scutinanthe*, *Thw.* *Colephonia*, *Comm.* *Pimela*, *Lour Fl. Coch.* *Canariopsis*, *Blume Mus. Bot.* 1. 222.

CANARIUM BRUNNEUM. (*Thw.*) A tree 50 or 60 feet high, branchlets and young leaves rufo-tomentose, leaves unequally pinnate 10-20 inches long, leaflets 5-11, oblong slightly oblique acuminate, entire, 4-8 inches long 2-3 broad reddish, petioles 4 lines long sulcate above, tumid at the base, striated, panicles axillary many flowered tomentose, flowers 3 lines long, sepals 5 erect, petals 5 valvate fleshy coriaceous persistent, the length of the calyx, stamens 10 cohering in the lower part in a ring and consolidated with the base of the calyx and corol, anthers oblong introse, fixed by their back, ovary 2 celled, drupe oblong rufo-tomentose attenuated at both ends about 1 inch long, cotyledons undivided. *Thw. En. Pl. Zeyl.* p. 410. *Scutinanthe brunnea*, *Thw. Hook. Journ. of Bot.* viii. p. 266. t. 3 & *En. Pl. Zeyl.* p. 78.

Ceylon, in the Central provinces, at an elevation of 2,000-3,000 feet, called Mahabulumora.



Coverdale, del.

Canarium brunneum (Thunb.)

Nunphy, L. del.

CANARIUM STRICTUM. (Nat. ord. Burseraceæ.)

CANARIUM STRICTUM. (Roxb.) A very large tree, polygamous, trunk tall and straight; young branches, petioles, panicles, and costa beneath, densely rufo-tomentose, leaves equally or unequally pinnate 1-4 feet long, by 10-20 inches broad, leaflets brilliant-red when young and densely tomentose on both sides, at length glabrous and shining above, soft and densely tomentose beneath, (the tomentum being reddish on the costa and veins but otherwise whitish) ovate to oblong, acuminate, often very unequal at the base, about 4-7 opposite or subopposite pair with or without a long petioluled odd one, more or less crenulate or serrate particularly when young or subentire, 5-12 inches long by 3-6 broad, petiolules about 3 lines long; panicles axillary densely rufo-tomentose (as is the calyx) a little shorter than the leaves, flowers white crowded towards the apex of the pedicels, calyx cupular 3-4 fid valvate persistent, petals 3-4 more than twice as long as the calyx much imbricate, slightly hairy on the outside towards the apex; male flowers, disk none, staminal tube submembranaceous as long or a little longer than the calyx terminating in 6-8 filaments which are $\frac{1}{3}$ rd the length of the calyx slightly dilated at the base and attenuated upwards, anthers oblong slightly acute dehiscing longitudinally attached at the back slightly above the base, rudiment of the ovary small 6 lobed glabrous below densely hairy towards the apex; female flower unknown, drupe oval tapering at both ends, putamen hard woody 3 celled.

This very beautiful tree is most abundant in all the moist ghat forests on the western side of the Madras and Bombay Presidencies up to 4,000-4,500 feet, but it does not occur in Ceylon or elsewhere, and it is never seen in dry forests, its brilliant crimson foliage makes it a most beautiful sight when in young leaf, the leaves of saplings and young trees are very much larger than those of adults, the tree is known as the "black dammer" to Europeans and is called Karapu Kungilam in Tamil; but also receives the names of Googal and Dhup, and in S. Canara Mandà Dhoop, a brilliant black dammer exudes from incisions in the trunk which is a considerable article of trade with some of our hill tribes, this dammer is used medicinally and for various purposes; it is insoluble in cold, but partially soluble in boiling alcohol with the addition of camphor; when powdered it is readily soluble in oil of turpentine, it emits a more resinous smell and burns with more smoke than the Vateria resin, a small piece makes an excellent "fire reviver," the tree flowers early in the year, generally in January or February, but sometimes as late as April. I am not acquainted with the timber.

The following is Mr. Broughton's report upon some of the resin submitted to him for chemical analysis.

This well known substance offers little chance of usefulness in Europe, at least when the many resins are considered that are found in the market at a far less price. It is used in this country for many small purposes, as in the manufacture of bottling wax, varnishes, &c. Its colour when in solution is pale compared with its dark tint when in mass. Though insoluble in spirit, its solution in turpentine forms a tolerable varnish. When submitted to destructive distillation it yields about 78 per cent of oil resembling that obtained from common colophony. But I fear in the majority of its possible applications it possesses few advantages over ordinary resin at 7s. 6d. per cwt. The number of substances suitable for coach varnishes have lately become very numerous in Europe, common resin is now purified by a patent process consisting of distillation with superheated steam, by which it is obtained nearly as transparent and colorless as glass, in such amount that a single firm turns out 60 tons per week.

The figure represents a branch in bud, and nearly the whole of a panicle from a male tree. Fig i. is the stamen tube from a 3 merous male flower; fig. ii. the same from a 4 merous flower; iii. abortive 6 lobed ovary opened out. In the plate are also analysis of the flowers of *Canarium commune* and *C. Zeylanicum* (communicated by Dr. Thwaites.)



Govindoo, del.

Camaridium strictum (Ros.)

Thompson, lith.



FILICIUM DECIPIENS. (Nat. ord. Burseraceæ.)

FILICIUM. *Thw.*—GEN. CHAR. Flowers polygamous, calyx 5 parted, lobes imbricate, petals 5 small without scales imbricate, disk tomentose 5 lobed, stamens 5 inserted on the disk, filaments filiform, anthers ovate-sagittate, ovary sessile globose 2 celled (sterile in the male flowers), style short uncinat, stigma simple or slightly 2 lobed, ovules solitary in the cells pendulous from the apex, drupe fleshy with a membranaceous putamen 1-2 celled 1-2 seeded, seed oblong, testa membranaceous, embryo exalbuminous curved, cotyledons foliaceous plicate, radicle dorsal directed towards the hilum and nearly reaching it. A tree, leaves alternate coriaceous unequally pinnate, rachis winged, flowers small white paniced. *Thw. En. Pl. Zeyl. p. 408. Pteridophyllum, Thw. in Hook. Kew. Journ. vi. 65. t. 1.*

FILICIUM DECIPIENS. (WA.) A middling sized tree all the young parts clothed with scurf like scales, leaves when young slightly puberulous in the costa beneath, more or less scaly on both sides and slightly glutinous at length glabrous, unequally pinnate 10-15 inches long by 3½-7 wide, rachis interruptedly winged, the portion between each leaflet tapering at the base and truncated at the apex, leaflets 6-12 alternate or subopposite pair, linear to narrow oblong tapering at the base quite entire or slightly repandulate towards the apex, panicles axillary large shorter than the leaves angled ; flowers, &c. as in the generic character.—*Rhus decipiens, WA. Prod. p. 172.*

This very elegant fern-leaved tree is found more or less throughout the Western ghat forests of the Madras Presidency and in Ceylon, and has been introduced into gardens ; it is very abundant in the moist forests of the Anamallays at about 4000-4500 feet elevation and also at much lower altitudes, the timber is strong and valuable for building purposes, it flowers in December and January and ripens its fruit in March, in Ceylon it is called Pehimbia.

The drawing of the branch in fruit is from a specimen collected on the Annamallays. The analysis is from a drawing by Dr. Thwaites. i. a male flower ; ii. the same petals removed ; iii. a fertile flower ovary removed ; iv. a section of a fertile flower showing the ovules and the position of the stamens.



Courtesy, del.

Filicium decipiens (WA.)

Dumortier, Icon.



AGLAIA ROXBURGHIANA. (Nat. ord. Meliaceæ.)

For Gen. Char. see under "Meliaceæ" in the Manual.

AGLAIA ROXBURGHIANA. (WA.) A large tree polygamous, all the young parts more or less scurfy with reddish scales, leaves unequally pinnate 6 inches to 1 foot long, leaflets opposite or alternate 2-4 pair with an odd one, always more or less lanceolate but sometimes obovato-lanceolate to obovate spatulate, quite entire, paler beneath, 2-5 inches long by 1-1½ broad, petiolules 2-6 lines long, panicles axillary all more or less scurfy from much shorter to longer than the leaves, generally longer and more compound in the male, and shortened in the fertile, flowers very small generally a little larger in the fertile, pedicels 1-3 lines long, calyx 5 fid scaly or glabrous and often ciliate, petals 5 often scaly on the outside when young, staminal tube subglobose from nearly entire to 5 toothed or lobed, anthers 5 sessile (but the tube immediately below each anther is often more or less thickened and gives the appearance of there being a regular filament) quite included or their apices slightly protruded above the tube, fruit from nearly globose to pear-shaped.—Milnea Roxburghiana, WA. Prod. p. 119. Milnea apiocarpa, Thw. En. Pl. Zey. p. 60.

Very common throughout the ghat forests on the western side of Madras Presidency up to 4,000 feet, and in parts of Mysore, &c., and in Ceylon; it is very variable in the shape of the leaves and fruit and amount of pubescence, the timber is strong and useful for building, the tree generally flowers in March and April, but I have also seen it in flower at other seasons. Fig A represents a common form (a branch of the fertile tree with dissection of flowers of the male tree). B is a variety from the Tinnevelly hills (Attraymally ghat) a male tree with dissections of the flowers, this variety has the leaves obovate-spatulate, the dissections are all from male flowers, but the female flower only differs in having a fertile ovary.

One variety or species in my Herbarium, a large tree from South Canara which I refer doubtfully to this species, has the leaves about 2 feet long and the leaflets ovate-lanceolate from a broad base 7 inches long, male panicles nearly as long as the leaves and very compound, flowers in no way differing from those of Roxburghiana (fig. A), fertile flowers and fruit not seen.

Fig A is a branch of a fertile tree in young bud and young fruit, and dissections of male flowers (all from the Annamallays). Figure B is a male tree and dissections of the flowers (from South Tinnevelly.)



fig. B

fig. A



Gorindoo, J. B.

Aglaia Roxburghiana (W.)

Dumphy, Libb.



LANSIUM ANAMALLAYANUM. (Nat. ord. Meliaceæ.)

LANSIUM. *Rumph.*—GEN. CHAR. Flowers dioecious, sepals 5 rounded imbricate, petals 5 rounded connivent imbricate, staminal tube globose crenulate at the mouth, anthers 10 alternately shorter, the apices of the 5 longer ones just exerted, disk inconspicuous, ovary globose 3-5 celled, style very short thick, stigma truncate 3-5 lobed or radiate, ovules 1-2 in each cell fixed to the axis, berry with a rind 5-celled or by abortion 1-4 celled indehiscent, cells 1-2 seeded. Seed solitary or twin collateral oblong, hilum ventral, aril pulpy covering the whole seed, testa coriaceous, cotyledons transverse, radicle superior. Trees, leaves unequally pinnate, flowers small in axillary racemes or panicles or branched spikes, berry yellow or red, aril sometimes edible.—*Sphærosacme*, *Wall. in part.*

LANSIUM ANAMALLAYANUM. (Bedd.) A good sized tree, leaves 6-9 inches long unequally pinnate, glabrous, leaflets 3-5 elliptic obtusely acuminate, attenuated at the base, entire, 3-4½ inches long by 1½-2 broad, furnished with hairy glands in the axils of the veins beneath, petiolules about ½ an inch long, flowers in axillary paniced spikes, peduncle very short 1-2 lines long, branchlets 2-3 inches long, flowers pentamerous hermaphrodite (always?) yellow, about 2 lines in diameter, sepals imbricate rounded ciliate, with 1-2 minute bracts at the base, petals about twice as large, imbricate, rounded at the apex, stamen-tube obsoletely 5 cleft, anthers 10 alternately shorter, the 5 longer ones just appearing above the apex of the tube, filaments adglutinate to the tube and not separable with the anther, ovary densely strigose sessile on a very small disk, 3 lobed 3 celled, ovules 1 in each cell attached to the axis near the base (or 2 ovules in each cell?) style very short or obsolete, stigma large obtusely 3 lobed, fruit oblong with a dry greyish rind size of a grape, 2 celled, 2 seeded, seed completely covered with a very succulent aril. *Bedd in Linn. Trans. vol. xxv., and Icones Plant. Indiæ tab. civ.*

I formerly described the ovary cells as 2 ovuled, though I only figured them as 1 ovuled; in dissecting several flowers I now find only 1 ovule in each cell, but it probably varies.

A handsome tree, common in the dense moist forest of the Anamallays (particularly in the Anagoondy shola) at an elevation of about 2000 feet, also in Malabar (foot of the Nilgiris); it flowers early in April, and the fruit ripens in July, the succulent aril in the latter is greedily eaten by monkeys and birds; it is the only species of the genus found in the Peninsula, one species occurs in the Himalayas and a third in Java.



Govindoo, det.

Lansium Anamallayanum (Budd.)

Thompson, Lith.



AMOORA ROHITUKA. (Nat. ord. Meliaceæ.)

For Gen. Char. see under this genus in the Manual.

AMOORA ROHITUKA. (Roxb.) A small or middling sized tree, polygamous, trunk pretty straight, bark smooth ash colored, leaves alternate unequally pinnate 1-2 feet long, leaflets 4-8 pair opposite obliquely oblong glabrous shortly pointed at the apex 3-6 inches long by 2-2 $\frac{1}{4}$ broad, petiole less than $\frac{1}{2}$ an inch long slightly pubescent when young at length glabrous inflorescence axillary, paniced on the male tree, and spiked on the fertile. Male panicles axillary or a little above the axils somewhat drooping very large and much branched, but shorter than the leaves, flowers numerous, pedicels 2-3 lines long, calyx 5 parted imbricate, petals 3 oval to orbicular concave imbricate, stamen-tube globular bluntly 3 lobed at the apex, anthers 6 sessile included, or with the apices just appearing at the mouth of the tube attached by the centre of their back to the tube, a small rudiment of an ovary hairy at the base and 3 lobed at the apex, fertile spikes $\frac{1}{2}$ or a little more than half the length of the leaves, flowers as in the male except that they contain a fertile ovary which is 3 celled with 2 ovules in each cell superposed and attached to the middle of the axis, stigma subsessile 3 lobed, lobes emarginate, capsule round reddish 1 $\frac{1}{2}$ inches in diameter a little attenuated at the base, 3 celled 3 valved opening from the apex, seed oblong with a brown testa enclosed completely in a fleshy scarlet aril.—*Andersonia Rohituka*, *Roxb. Fl. Ind.* ii. 213.

This tree is met with sparingly throughout the Western ghat forests of the Madras Presidency up to 3500 feet elevation in Bengal and in Ceylon (where it is called Hingoot), it is rather common in the Anamallays, an oil is extracted from the seed in Bengal. The specimen figured and the dissections are all from a male tree gathered in the Anamallay hills.



Govindoo, del.

Dumphy, Lith.

Samanea Rohituka (Presl.)



ORDER XXV—CHAILLETIACEÆ.

Flowers hermaphrodite or unisexual, sepals 5 connate below or free, equal or unequal, imbricate, petals 5 more or less exceeding the calyx free and equal or more rarely more or less connate with the stamens, usually more or less unguiculate 2-fid or 2-partite; stamens 5 alternate with the petals (or rarely united with them), anthers 2 celled elliptical to linear the connective often dorsally thickened; hypogynous glands opposite to the petals free or connate, ovary free (rarely inferior in some extra-Indian examples) 2-3 celled, styles 2-3 (rarely only 1 in species not Indian) free or connate short or elongate, stigmas capitate or simple, ovules geminate, drupe oblong or compressed pubescent dry or fleshy, the epicarp opening and disclosing the putamen or indehiscent putamen 1-2 celled, bony or crustaceous sometimes dividable, cells 1 seeded, seeds pendulous, testa membranaceous, albumen none, embryo large, cotyledons amygdaloid, radicle superior small. A small order only represented by 1 small tree in S. India.

CHAILLETIA. DC.

Gen. Char.: Flowers hermaphrodite or unisexual; calyx 5 parted, lobes nearly or quite equal more or less imbricate, petals 5 usually more or less clawed 2 fid or 2 partite, rarely very shortly united with the stamens into a tube at the base; stamens 5, anthers elliptical to linear the connective frequently thickened behind, hypogynous glands 5 distinct or connate opposite to the petals. Ovary free (rarely inferior in species not Indian), styles 2-3 (rarely 1 only) free or connate short or elongate, stigmatose at the apex, drupe coriaceous dry or fleshy, putamen 1-2 (rarely 3) celled crustaceous or bony. Small trees or shrubs, pubescent or glabrous, leaves alternate entire, flowers small usually white in axillary pedunculate or nearly sessile cymes or glomerules. DC. in Ann. Mus. 17. 153. Moacurra, Roxb. Fl. Ind. ii. 69. Wahlenbergia, Br. Symphyllanthus, Vahl. Dichapetalum, Thouars. Leucosia, Thouars. Quilesia, Blanco.

1. CHAILLETIA GELONIODES, Roxb.—A small tree or often only a shrub, bark rough, young shoots villous and yellowish, leaves alternate short petioled broad lanceolate entire taper-pointed membranaceous 3-4 inches long by 1 1/2 broad, stipules subulate villous, flowers numerous small on axillary solitary short peduncled fascicles, calyx-segments oval hoary, petals free the length of the calyx but narrower and smooth, glands 5 small oval, ovary (in the fertile flowers only) ovate cordate a little compressed downy 2 celled with 2 ovules in each, pendulous from the apex of the cells, styles 2 recurved, stigmas somewhat 2 lobed, capsule transversely oval 2 lobed soft with grey or whitish down, size of a nutmeg, epicarp opening, putamen dividable into 2.—Moacurra geloniodes, Roxb. Fl. Ind. ii. p. 69. Chailletia, Benth. & Hook. Gen. Pl. 1. p. 341.

This small tree or shrub is very common in all the Western ghat forests of the Madras Presidency up to 4000 feet elevation, also in Ceylon, and Bengal (where it is called Moakurra.)

Analysis of Genera, Pl. IX, fig. 1.

CHAILLETIA GELONIODES.

- 1 & 2. Bud and flower, showing the imbricate sepals.
3. A male flower opened.
4. A petal removed.
5. Anthers.
6. Ovary from a fertile flower.
7. The same cut vertically.
8. A fruit.

ORDER XXVI—OLACINEÆ.

Flowers regular, hermaphrodite or unisexual. Calyx small, 4-5 toothed, fid, or partite, occasionally nearly entire or obsolete, unchanged or accrescent in fruit. Petals 4-5, free or connate more or less, usually valvate in æstivation. Stamens 4-10, rarely 12-40 free or united below more or less to the petals, rarely monadelphous; anthers 2-celled. Disk cupuliform entire or lobed, rarely unilateral, or 0. Ovary free or the lower part immersed, 1-celled or 3-5-celled, the dissepiments frequently incomplete above. Style simple. Ovules solitary in each division of the ovary (rarely several in each cell) or geminate in 1 celled ovaries, pendulous. Fruit 1 celled, 1 seeded, dry or drupaceous, indehiscent. Seed usually with a copious fleshy albumen, rarely exalbuminous; embryo entire or nearly so, usually penniveined; exstipulate. Inflorescence various. Flowers small.

Table with 2 columns: Characteristic and Genus. Rows include: * Stamens mixed with staminodia... OLAX; ** Stamens all fertile as many as the petals and opposite to them. Calyx accrescent in fruit, ovary 3-5 celled nearly to the apex... STROMBOSIA; Calyx unchanged, but disk enlarging with the fruit, ovary 1 or imperfectly 2 celled, ovules 2-3... ANACOLOSA; Calyx unchanged, disk of 4-5 scales surrounding the ovary, ovary 1 celled 1 ovuled... OPILIA; *** Stamens all fertile as many as the petals and alternate with them; † Petals glabrous or subglabrous; Anthers tufted with soft hairs, flowers capitate in umbellate spikes... LASIANThERA; Anthers glabrous, or very slightly pilose, flowers in axillary or lateral cymes, stigma sessile large discoid... GOMPHANDRA; Anthers glabrous, style eccentric or oblique, stigma small... APODYTES; ++ Petals villous... MAPPIA.

Not an order of much importance, but little is known of the timber of any of its representatives; the genera Strombosia, Anacolosa, and Lasianthera each furnish a single species, lofty trees, the first found in the Western ghat forests of S. India and in Ceylon, the second only detected as yet in the dense forests of the Anamallays, and the third peculiar to Ceylon. Olax is represented by two small trees, both common to Ceylon, and one found all over the Madras Presidency. Opilia has a single species, a straggling weak



tree or shrub common throughout this Presidency and in Ceylon. Gomphandra two small trees or large shrubs common throughout the western forests of this Presidency and in Ceylon. Apodytes and Mappia each give a middling sized tree common to Ceylon and the western forests of Southern India, the latter is very fetid when in blossom; the only other plant belonging to this order (in S. India) and not coming within the scope of this Flora is a climbing species of Olax, Wight's genus. Bursinopetalum is Mastixia of Blume and belongs to Cornaceæ.

OLAX. LINN.

Gen. Char. : Calyx cupuliform entire or nearly so, small whilst flowering. at length often accrescent and enclosing the fruit, petals 5-6 valvate free or slightly coherent or connected by alternating filaments, stamens generally 3 antheriferous alternate with the petals, and 5 anantherous and opposite to them, or occasionally 5 antheriferous and opposite the petals, and 3 anantherous and alternate, anthers ovate versatile, filaments more or less adnate to the petals, ovary 1 celled above and more or less 3 celled at the base narrowed into a style, ovaries 3 pendulous from the apex of the central placenta, stigma obtuse or 3 lobed, drupe oblong or globose enclosed within the accrescent calyx or naked, nut crustaceous 1 seeded, seed spuriously erect, embryo minute oblong in the apex of copious albumen. Glabrous trees or shrubs. leaves alternate entire or nearly so, flowers small in short racemes or the common peduncle nearly obsolete, rarely solitary.—Spermaxyrum, Labill. Fissilia, Comm. Lopadocalyx, Kl. Pseudaleia and Pseudaleioides, Thours.

1. OLAX ZEYLANICA, L.—A small tree, erect, young branches acutely angled glabrous transversely rugulose, leaves glabrous shining ovate acuminate about 2 inches long by $\frac{3}{4}$ of an inch broad, racemes axillary very short few flowered, pedicels short and each covered with a bract as long as itself, sterile filaments with their apices bifid DC. Prod. 1. 532;—WA. Prod. p. 88;—Thw. Pl. Zey. p. 42. Ceylon, abundant at the south of the island, called Malla, the leaves are eaten in curries.

2. OLAX WIGHTIANA, Wall.—A shrub or small tree, branches terete glabrous, leaves ovate or oblong quite glabrous upper side shining under pale, $3\frac{1}{2}$ 4 inches long, by $1\frac{1}{2}$ broad, petioles about 3 lines long, racemes axillary about 1 inch long often several together lax usually compound, pedicels about 4 lines long many times longer than the subtending bractes, petals usually 5, sterile anthers bifid. Wall. L. n. 6779;—WA. Prod. p. 89.

Easily distinguished from Zeylanica (and from O. scandens, a climbing plant) by its lax racemes and flowers double the size. Common throughout the Madras Presidency and in Ceylon.

Analysis of Genera, Pl. IX, fig. 2.

OLAX WIGHTIANA.

1. A bud showing the obsolete lobed calyx, the bract much smaller than the pedicel and the valvate petals.
2. Corol opened showing the 5 petals, the 3 fertile stamens, 2 of which are alternate with the petals and the 3rd placed on one of the petals a little to its side, and the 5 sterile bifid stamens each opposite to a petal, all 8 being adnate to the petals.
3. A flower, the corol removed, showing the young ovary, the style 3 ribbed towards the apex and the 3 stigmas.
4. The ovary in a more advanced stage showing the accrescent calyx
5. Fertile anthers, front and back view.
6. Ovary cut vertically, showing that it is 1 celled at the apex with the placentas rising from the base, bearing 3 pendulous ovules at their apex.
7. The base of the ovary cut horizontally, showing the 3 cells and 3 ovules.

STROMBOSIA. BL.

For Gen. Char. see letter press to Pl. cxxxvii.

1. STROMBOSIA CEYLANICA, Gardn.—For description, &c. see Pl. cxxxvii.

ANACOLOSA. BL.

For Gen. Char. see letter press to Pl. cxxxviii.

1. ANACOLOSA DENSIFLORA, Bedl.—For description, &c. see Pl. cxxxviii.

OPILIA. ROXB.

Gen. Char. : Calyx minute, 5 or rarely 4 toothed. Petals 5, rarely 4 hypogynous, valvate in the bud. Stamens as many opposite to the petals, free, filaments filiform; anthers ovate. Disk of 5, rarely 4 scales, alternating with the stamens. Ovary 1 celled, tapering into a short thick truncate style; ovule solitary, erect. Drupe with a thin sarcocarp and crustaceous endocarp. Seed erect; embryo linear, short, or nearly as long as the albumen. Shrubs or small trees, sometimes climbing. Leaves alternate, entire. Flowers in axillary racemes; pedicels 3 together in the axils of peltate bracts, which are imbricate at an early stage, but fall off before the flowers expand.

1. OPILIA AMENTACEA, Roxb.—A scrambling half climbing shrub or small weak tree, glabrous, or the young leaves and shoots minutely tomentose pubescent. Leaves petiolate, ovate lanceolate, or almost oblong, acute or acuminate, 2 to 3 or even 4 inches long, or rarely shorter and very obtuse, entire, thinly coriaceous, the veins usually prominent though fine. Racemes before flowering resembling little cylindrical cones of $\frac{1}{2}$ inch, the peltate imbricate but almost squarrose bracts alone visible, when in flower slender, about 1 inch long without bracts. Flowers very small, on filiform pedicels of about 1 line. Petals about $\frac{1}{2}$ line long, very deciduous. Drupe ovoid or globular, $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Embryo linear, nearly as long as the albumen. Wight Illust. t. 40. O. Javanica, Miq. Fl. Ind. Bat. i. part i. 784;—Roxb. Pl. Corom. ii. 31. t. 158;—Benth. Fl. Aust. vol. i. 394.

Not uncommon in jungles throughout the plains of the Madras Presidency and in Ceylon,



Analysis of Genera, Pl. IX, fig. 3.

OPILIA AMENTACEA.

1. A bud, showing the obsoletely toothed calyx and the valvate petals.
2. A flower, showing the 5 large glands alternate with the stamens the latter being opposite the petals.
3. The same, petals removed.
4. Anthers, front and back view.
5. The ovary.
6. The same cut vertically, showing the erect ovule (not pendulous as figured by Wight and as generally described).
7. The ripe fruit.
8. The same cut horizontally, showing the seed with the central cylindrical embryo.
9. Seed cut vertically, showing the embryo nearly as long as the seeds.

All drawn from fresh specimens collected at the foot of the Nilgiris.

LASIANTHERA. P. DEBEAUV.

For Gen. Char. see letter press to Pl. cxxxix.

1. LASIANTHERA APICHAULIS, *Thw.*—For description, &c. see Pl. cxxxix.

GOMPHANDRA WALL.

Gen. Char.: Flowers polygamous subdioecious, calyx cupulate minute 4-6 toothed, petals 4-6 inserted on a very small hypogynous disk valvate with incurved tips more or less cohering in a tube free at the apex, filaments as many hypogynous alternate with the petals and slightly coherent with them at the base or free distinct or more or less connate into a tube, anthers adnate to the inside of the apex of the filaments sessile or nearly so or attached by their back to a longish thread, ovary 1 celled, stigma sessile broadly discoid, ovules 2 pendulous, drupe oblong, putamen crustaceous, seed pendulous, albumen fleshy 2 dividable somewhat resembling the fleshy cotyledons, embryo small apical. Small glabrous or pubescent trees or large shrubs, leaves entire, flowers small cymose.—*Stemonurus*, *Bl. Bijdr.* 648, ex part., *Platea*, *Thw.* (not *Blume.*)

1. GOMPHANDRA AXILLARIS, *Wall.*—A small tree or large shrub glabrous or the branches minutely puberulous, leaves submembranaceous conspicuously veined and veinlets very finely reticulated, very variable in shape from narrow lanceolate to almost orbicular terminating in a rather long acumination from 2½ to 5½ inches long, ½-2½ broad, glabrous on both sides or slightly puberulous when young, petioles ¼-½ inch long, cymes pubescent short axillary many flowered in the male, few flowered in the female, calyx very small, petals 4-5 glabrous about 3 lines long, much united, filaments 4-5 hairy at the apex, anthers sessile or subsessile within the apex of the filament just appearing above the petals, ovary small oblong smooth, stigma large fleshy, drupe oblong smooth. *Wall. in Roxb. Fl. Ind.* ii. 328 under *Lasianthera tetrandra*. *Gomphandra polymorpha*, *Wight Ill.* 1. p. 103, & *Icones t.* 954. *Stemonurus axillaris*, *polymorphus*, *Ceylanicus* and *Heyneanus*, *Miers. in Ann. of Nat. Hist. Ser. 2. vol. x. p. 37-42.*

Very common in all the western forests of the Madras Presidency and in Ceylon, from the plains up to 4,000 feet elevation.

2. GOMPHANDRA CORIACEA, *Wight.*—A small tree or large shrub glabrous or the young parts, leaves, &c. minutely puberulous; leaves coriaceous opaque and inconspicuously veined, generally shining above, as variable and similar in shape and size as the last species, and from scarcely acute to a long narrow acumination, cymes pubescent longer than in the last species, flowers 4-6 merous, anthers attached by a thread to the inside of the filament, the rest as in *axillaris*, but the filaments are less hairy. *Wight Ill.* 1. p. 103. *G. polymorpha*, *Icones Pl.* 953. *Stemonurus Gardneri* & *Walker*, *Miers. l. c.* *Platea Wightiana*, *Miers. l. c.*

Very common on the Nilgiris, Pulneys and Anamallays at the higher elevations, and throughout the western forests of the Madras Presidency and in Ceylon from an elevation of about 3000 feet to 7000.

Analysis of Genera, Pl. IX, fig. 4.

GOMPHANDRA CORIACEA.

1. A bud, showing the slightly toothed calyx and valvate sepals.
2. A flower open.
3. A flower, corol removed, shewing six filaments inserted into the bottom of the calyx round the disk.
4. The same open, showing the ovary and disk.
5. A corol removed, showing the six coherent but easily separable valvate petals and the inflexed tips.
6. Filament, back view, shewing the weak white hairs at its apex.
7. The same inside view, showing the anther as it naturally appears.
8. The same, showing that the anther is really attached by its back to a minute filiform true filament, which latter is attached to the apparent filament (in reality a staminal tube) below the apex on the inside.
9. Ovary cut vertically, showing its single cell and 2 pendulous ovules.
10. A fruit.

All drawn from fresh specimens collected on the Nilgiris. As far as I can make out from my dried specimens of *G. axillaris*, the anther is always sessile or subsessile within the apex of the filament; it certainly never has such a long thread as in this species; both are probably 4-6 merous, and the filaments are sometimes quite free and at other times quite consolidated into a tube. I almost doubt their being distinct species, and think that *coriacea* may be a higher level coriaceous variety of *Wallich's axillaris*. I have a great variety of forms in my Herbarium.



APODYTES, E. MEYER.

For Gen. Char. see letter press to Pl. cxl.

- 1. APODYTES BENTHAMIANA, *Wight*.—For description, &c. see Pl. cxl.

MAPPIA, JACQ.

For Gen. Char. see letter press to Pl. cxli.

- 1. MAPPIA FETIDA, *Miers*.—For description, &c. see Pl. cxli.

ORDER XXVII—ILICINEÆ.

Flowers regular, hermaphrodite or unisexual, calyx of 4-6 (rarely 3) sepals, imbricate, usually persistent, petals 4-6 (rarely 3) hypogynous imbricate in the bud, sometimes united in a lobed corolla. Stamens of the same number as petals and alternate with them hypogynous, free or adhering to the corolla at the base, anthers 2-celled opening inwards. Disk none except the thickened base of the ovary. Ovary free 3 to 5 celled, rarely many celled; stigma broad or capitate, sessile or supported on a distinct style. Ovules 1 or 2 in each cell, pendulous, with a superior micropyle. Fruit a drupe, with as many one-seeded pyrenes as cells. Seeds pendulous, testa membranous, embryo very small in the apex of a fleshy albumen. Trees or shrubs. Leaves alternate, simple, without stipules. Flowers small, in axillary umbels or cymes, rarely solitary or terminal. Fruit small.

A small order only represented in India by the genus *Ilex*, which has 5 species in South India and Ceylon. *Ilex Wightiana*, *denticulata* and *Malabarica*, large timber trees, and *I. Gardneriana* and *Walkeri* small trees; the first and second are common to the western forests of Madras and to Ceylon; the third and fourth are only found in our western forests; and the fifth only in Ceylon. The common English holly, *Ilex aquifolium*, has been introduced on the Nilgiris, but will not make any growth.

ILEX, LINN.

For Gen. Char. see letter press to plate of *I. denticulata*, Pl. cxlii.

- 1. ILEX DENTICULATA, *Wall*.—For description, &c. see Pl. cxlii.
- 2. ILEX MALABARICA, *Bedd*.—For description, &c. see Pl. cxliii.

3. ILEX WIGHTIANA, *Wall*.—A very large umbrageous tree, glabrous or the young parts very minutely puberulous, leaves alternate from ovate to ovate elliptic acute, acuminate or mucronate, coriaceous quite entire, dark green and shining above a little paler beneath, 1½-2½ inches long by 1-1½ broad, petioles about ½ an inch long channelled along the upper side and inconspicuously puberulous, peduncles ¼ inch long axillary or from the scars of fallen leaves, generally bearing 2 branched, 3-5 flowered pedicels at the apex and a solitary longish pedicelled flower in the fork, branched pedicels about the length of the peduncles, all minutely pubescent, flowers polygamous pentamerous 3 lines in expansion, petals combined into a rotate corol to fully ½ their length, stamens erect slightly incurved inserted on to the centre of the corol just within the lobes, drupe size of a pea quite red when ripe. *Wight Icones tab. 1216.*

This is a very large tree, often attaining an immense girth, it is very common on the Nilgiris at 6-8000 feet elevation, and in other localities on our western mountains, but generally at considerable elevation, and it is also found in Ceylon; the timber is a pale yellow and very useful for building purposes and plank, bowls, platters, &c., and is much in use on the Nilgiris, where it is called *Horralu* by the Burghers.

A small fragment of a flowering branch (male) and dissections of a male flower of this tree are figured in Plate cxlii. (with *Ilex denticulata*.)

4. ILEX GARDNERIANA, *Wight*.—A small tree or large shrub, glabrous, leaves subcoriaceous or membranaceous ovate lanceolate or sub-cordate quite entire ending in a long acumination, about 4-6 inches long by 1-1½ inches broad, petioles 1 inch long, peduncles axillary or aggregated in the axils of fallen leaves slightly pubescent and together with the 5 merous flowers very similar to those of *I. Wightiana*, only rather more crowded and the flowers slightly larger; fruit, &c. as in *Wightiana*. *Wight Icones tab. 1217.*

This small tree I have only seen on the Nilgiris (western side), it is closely allied to *Wightiana*, but is seldom much more than a shrub.

5. ILEX WALKERI, *Wight and Gard. MSS.*—A small tree, leaves coriaceous glabrous shining entire or rarely sparingly denticulate, oblong or retundate acute or retuse and mucronate, more or less attenuated at the base, 4-12 lines long by 2-7 lines broad, petioles 1½-2 lines long slightly winged, umbels sessile or shortly pedunculate, pedicels about 1½ lines long, flowers pentamerous. *The En. Pl. Zeyl. p. 184.*

Ceylon, in the central provinces, 5000-8000 feet elevation.



Challesiaceae

Placmeae

Celastrineae

