

FLORA
OF THE
PRESIDENCY OF MADRAS

BY
J. S. GAMBLE, C.I.E., M.A., F.R.S., F.L.S.
LATE OF THE INDIAN FOREST DEPARTMENT

PART I.
RANUNCULACEAE TO OPILIIACEAE

PUBLISHED UNDER THE AUTHORITY OF THE
SECRETARY OF STATE FOR INDIA IN COUNCIL

Calcutta

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I. THALAMIFLORAE.

Sepals herbaceous, rarely petaloid, distinct, imbricate or valvate or connate in a tube with lobes imbricate valvate or open, free or, rarely, with the base of the tube adnate to the base of the ovary. *Torus* small, or raised or stalk-like, or thickened or fleshy or crowned by a disk, annular or cupular or flattened, entire or lobed or broken into glands, free or adnate to calyx and ovary or to ovary alone, rarely to calyx alone. *Petals* 1-2-seriate, unlike the sepals, or 2-many-seriate passing gradually from the sepals or as many as the sepals or fewer by abortion, inserted on the torus or adnate to the base of the calyx external to the disk, or sometimes when the disk is absent adnate at the base to the stamens, or 0. *Stamens* numerous or few, inserted on the torus or rarely on the base of the calyx, free or adnate to the base of the petals, or few and inserted around upon or within the disk. *Carpels* free or connate, or rarely more or less embedded in the fleshy torus, or immersed in the thickened disk.

Family I. RANUNCULACEAE.

Annual or perennial herbs or rarely shrubs. *Leaves* radical or alternate or rarely opposite. *Stipules* 0, or adnate to the petiole or, rarely, free. *Flowers* bisexual or unisexual, regular or irregular. *Bracts* rare. *Disk* very rare. *Sepals* 5 or more, rarely fewer, very rarely persistent, often petaloid, imbricate or rarely valvate. *Petals* 5 or more or 0, rarely 4 or 3, hypogynous, imbricate, often minute or deformed. *Stamens* hypogynous, usually numerous in many rows. *Anthers* adnate, opening laterally or outwards. *Carpels* numerous, rarely 1; free or rarely coherent; stigma simple, usually sessile; ovules anatropous, sometimes solitary, ascending with a ventral raphe or pendulous with a dorsal raphe, sometimes numerous and horizontal on the ventral suture. *Fruit* of one-seeded beaked or plumose achenes or many-seeded follicles or rarely a capsule or berry. *Seeds* small, with copious albumen and a minute embryo.

Leaves opposite; sepals valvate; climbing shrubs:—

Petals 0; tendrils 0; ripe carpels ovate.....1. **Clematis.**

Petals many, linear; terminal leaflet generally transformed into a tendril; ripe carpels linear 2. **Naravelia.**

Leaves radical or alternate; sepals imbricate; herbs:—

Petals 0, but sepals often petaloid:—

Flowers moderately large, supported by an involucre of bracts

3. **Anemone.**

Flowers small, not involucre 4. **Thalictrum.**

Petals and sepals present.....5. **Ranunculus.**

1. **Clematis**, Linn.

Climbing shrubs. *Leaves* opposite, simple or compound, exstipulate, petioles often twining. *Inflorescence* axillary or terminal. *Sepals* usually 4, petaloid, valvate. *Petals* 0. *Stamens* many. *Carpels* numerous, distinct, with 1 pendulous ovule in each. *Fruit* a head of sessile or stalked achenes with long usually feathery styles.

Stamens with glabrous filaments:—

Flowers over 1 in. in diam., few in a panicle; sepals velvety brown outside; leaflets usually 7-ribbed, sometimes serrate; achene tails 2-3 in. long:—

Sepals at maturity glabrous within; connective much produced beyond the anther; leaves 1-3-foliolate:—

Flowers erect; filaments uniform in thickness.....1. *smilacifolia*.

Flowers nodding; filaments constricted below the anthers

2. *Munroana*.

Sepals tomentose within when mature; connective produced very little if at all beyond the anther; leaves 3-foliolate...3. *theobromina*.

Flowers under 1 in. in diam., many in a panicle; sepals puberulous; leaflets 3-5-ribbed, sometimes coarsely toothed; achene tails 2 in. long:—

Flowers more than 7 in. in diam.; connective produced considerably beyond the anther.....4. *Bourdillonii*.

Flowers under 5 in. in diam.; connective not produced

5. *gouriana*.

Stamens with pubescent filaments; leaves pubescent or tomentose; leaflets usually 3-5-lobed, more or less coarsely dentate; flowers over 2 in. in diam., pale yellow:—

Sepals ovate, spreading from the base; veins of leaflets thick, prominent.....6. *Wightiana*.
 Sepals oblong-lanceolate, erect at the base, recurved at the tip; veins of leaflets slender, little raised 7. *nutans*.

1. *CLEMATIS SMILACIFOLIA*, Wall.; F. B. I. i. 3; Wt. Ic. t. 1.
 Hills of Ganjam; W. Gháts from S. Canara to Tinnevely, up to 5,000 ft.

2. *CLEMATIS MUNROANA*, Wt. Ill. i. 5, t. 1.
 Hill ranges from Coorg through the Nilgiris, Anamalais and Palneys.

3. *CLEMATIS THEOBROMINA*, Dunn in Kew Bull. 1914, 181.
 Nilgiris, at Coonoor and Naduvatam at 6,000 to 8,000 ft. alt.

4. *CLEMATIS BOURDILLONII*, Dunn in Kew Bull. 1914, 181.
 Travancore, Merchiston Estate, at 2,500 ft. alt.

5. *CLEMATIS GOURIANA*, Roxb.; F. B. I. i. 4; W. & A. 2; Wt. Ic. t. 933-4.

A very common species, found in hilly regions in almost all Districts.

6. *CLEMATIS WIGHTIANA*, Wall.; F. B. I. i. 5; W. & A. 2; Wt. Ic. t. 935.

Hills of Ganjam and south to the Kistna; common in the W. Gháts, especially in Nilgiris, up to 7,500 ft.

7. *CLEMATIS NUTANS*, Royle; F. B. I. i. 5.

Hills of the N. Circars, in Ganjam and Vizagapatam, up to 3,000 ft.

2. *Naravelia*, DC.

Climbing shrubs. Leaves 3-foliolate, terminal leaflet usually transformed into a tendril. Flowers axillary or in terminal panicles, normally ♂. Sepals 4-5. Petals 6-12, narrow, usually elongating after the fall of the calyx. Stamens many. Achenes long, narrow, stalked, prolonged into a feathery style, which persists in fruit as a twisted pilose tail.

NARAVELIA ZEYLANICA, DC.; F. B. I. i. 7; W. & A. 2; Roxb. Cor. Pl. ii. t. 188.

A climbing shrub with ovate-lanceolate downy sepals and elongated linear-clavate yellow petals. Fruit a head of linear achenes ending in twisted feathery tails.

Common in hedges and thickets in nearly all Districts.

3. *Anemone*, Linn.

Perennial herbs. *Leaves* radical, more or less cut or lobed. *Flowers* single or several together on simple or branched scapes; involucre 3-partite; bracts free or connate. *Sepals* 4-20, petaloid, imbricate. *Petals* 0. *Stamens* numerous, outer sometimes petaloid. *Carpels* many, 1-ovuled; ovules pendulous. *Fruit* a head of sessile achenes, with short or long, hooked or straight, naked or bearded, styles.

ANEMONE RIVULARIS, Ham.; F. B. I. i. 9. *A. dubia*, Wall.; W. & A. 3. *A. Wightiana*, Wall.; W. & A. 3; Wt. Ic. t. 936.

A strong perennial herb with rootstock sheathed in fibres. *Leaves* radical, long-petioled, 3-partite. *Flowers* about 1 in. in diam., sepals white within, blue outside or sometimes pink or yellow. *Achenes* glabrous with hooked styles.

Hills of the W. Gháts, especially in the Nilgiris, Anamalais and Pulneys, usually above 6,000 ft.

4. *Thalictrum*, Linn.

Erect, stiff, perennial herbs. *Leaves* compound; petioles sheathing, often auricled or stipuled. *Flowers* in panicles or racemes, often polygamous, not involucre. *Sepals* 4-5, petaloid, imbricate in bud. *Petals* 0. *Stamens* many. *Carpels* few or numerous; ovule 1, pendulous. *Fruit* a head of small sessile or stalked achenes; style persistent or deciduous.

Leaves more than three times ternately divided, leaflets mostly cuneate, obtuse at base; flowers white; achenes 2 in. long (with style) forming a loose head:—

Beak of achene $\frac{1}{2}$ of seed-bearing part 1. *javanicum*.

Beak of achene equal to seed-bearing part 2. *saniculaeforme*.

Leaves once or twice ternately divided; leaflets mostly orbicular, cordate; flowers white; achenes 1 in. (with style) forming a small compact globe 3. *Dalzellii*.

1. THALICTRUM JAVANICUM, Bl.; F. B. I. i. 13. *T. glyphocarpum*, W. & A. 2; Wt. Ic. t. 48.

Mahendragiri Hill in Ganjam; W. Ghát Range, usually at over 6,000 ft.

2. THALICTRUM SANICULAEFORME, DC.; F. B. I. i. 13.

Hills of W. Gháts in Mysore and Nilgiris, scarce.

3. *THALICTRUM DALZELLII*, Hook.; F. B. I. i. 13.

Mysore, in the Bababudah Hills.

5. *Ranunculus*, Linn.

Annual or perennial, land or water herbs. *Leaves* entire, lobed or dissected; stipules membranous or 0. *Flowers* white or yellow, single or panicled. *Sepals* 3-5, deciduous or caducous, imbricate. *Petals* 5 or rarely more, very rarely 0, often bearing a nectary near the base. *Stamens* many. *Fruit* a head or spike of beaked or apiculate achenes.

Achenes not compressed, oblong-globose; leaves long-stalked, oval or orbicular, coarsely crenate only, usually cordate; flowers yellow

1. *reniformis*.

Achenes compressed; leaves deeply divided:—

Achenes finely and evenly pitted; sepals spreading; petals yellow

2. *subpinnatus*.

Achenes tubercled or muricate; sepals reflexed:—

Achenes 5 times longer than their beak, with a few blunt tubercles; petals yellow.....3. *Wallichianus*.

Achenes only slightly longer than beak, with prominent, usually numerous and spiny tubercles; petals yellow 4. *muricatus*.

1. *RANUNCULUS RENIFORMIS*, Wall.; F. B. I. i. 16; W. & A. 3; Wt. Ill. i. t. 2, Ic. t. 75.

Higher hills of the W. Gháts, usually at over 6,000 ft.

2. *RANUNCULUS SUBPINNATUS*, W. & A. 4; Wt. Ic. t. 49.

W. Gháts, in the Nilgiris and Pulneys, at over 6,000 ft.

3. *RANUNCULUS WALLICHIANUS*, W. & A. 4; F. B. I. i. 20; Wt. Ic. t. 937.

W. Gháts, common, usually at over 6,000 feet.

4. *RANUNCULUS MURICATUS*, Linn.; F. B. I. i. 20.

Nilgiris, banks of Ootacamund Lake at 7,000 ft.

Family II. DILLENACEAE.

Trees, shrubs or herbs, sometimes climbing. *Leaves* alternate, simple, entire, toothed or rarely pinnatifid; petioles with sheaths and without stipules or without sheaths and with lateral deciduous stipules. *Flowers* yellow or white, sometimes very large. *Sepals* 5, imbricate, persistent. *Petals* (2-5) 1-11.

Stamens in many hypogynous series; anthers innate with lateral or apical dehiscence. *Carpels* 1 or more, free or joined at the axis; styles quite distinct; ovules amphitropous, solitary or few, and ascending or many, and attached to the ventral suture. *Fruit* follicular or indehiscent and sub-baccate. *Seeds* 1-many, with an aril, testa crustaceous, raphe short, albumen fleshy; embryo next the hilum, minute.

Herbs, usually stemless, with large radical leaves 1. **Acrotrema**.
Trees or climbing shrubs:—

Stamens with filaments thickened upwards and oblique anther cells; fruit of several shining follicles.....2. **Tetracera**.

Stamens with cylindric filaments and parallel anther cells; fruit globose, enclosed in the enlarged fleshy calyx.....3. **Dillenia**.

1. **Acrotrema**, Jack.

Herbs, usually stemless with woody rhizomes. *Leaves* large, parallel-nerved, entire, toothed or pinnatipartite, with deciduous sheathing stipules. *Scape* short, axillary, many-bracteolate. *Flowers* large, yellow. *Sepals* and *petals* 5 each. *Stamens* numerous, in 3 bundles, which alternate with the carpels; filaments thread-like; anthers erect, dehiscing from the middle to the top. *Carpels* 3, slightly cohering at the axis; styles subulate, recurved; ovules 2 or more. *Follicles* 3, bursting irregularly. *Seed* solitary; aril membranous; testa crustaceous, pitted.

ACROTREMA ARNOTTIANUM, Wight; F. B. I. i. 32.

Stem short, rarely none or elongated; leaves obovate-oblong, blunt, sharply toothed, 6-12 in. long; scape many-flowered, axis long or abbreviated.

Forests of W. Ghâts in Travancore and Tinnevely, at 1,000-3,000 ft.

2. **Tetracera**, Linn.

Climbing shrubs or trees, scabrid or pubescent. *Leaves* with parallel main nerves. *Flowers* in terminal or lateral panicles, hermaphrodite or sometimes unisexual. *Sepals* 4-6, spreading. *Petals* 4-6. *Stamens* many, with filaments dilated upwards and distant anther cells. *Carpels* 3-5; ovules many, in 2 rows.

TETRACERA LAEVIS, Vahl; F. B. I. i. 31. *T. Rheedii*, DC.; W. & A. 5; Wt. Ic. t. 70.

A glabrous climbing shrub with smooth leaves; sepals glabrous outside, silky within, broadly oval; petals white; follicles 1-2-seeded.

Forests of Malabar and Travancore.

3. Dillenia, Linn.

Trees. *Leaves* large, with conspicuous parallel main nerves. *Flowers* large, solitary or fascicled, yellow or white. *Sepals* 5, spreading. *Petals* 5, broad. *Stamens* cohering slightly at the base; anthers linear, dehiscing by pores or small slits; inner erect or recurved, introrse, outer recurved, extrorse. *Carpels* 5-20, cohering at the axis; ovules numerous. *Fruit* globose, comprising the matured indehiscent carpels and the enveloping thickened fleshy calyx; seeds not arillate.

Flowers 2-3 in. across, in few-flowered racemes; sepals silky; leaves ovate-oblong, crenate:—

Leaves blunt at top, cuneate at base, serrate, glabrous; petals narrow, spathulate; twigs and peduncles nearly glabrous 1. *retusa*.

Leaves blunt at base, crenate, pubescent, at least on the nerves; petals broadly obovate; twigs and peduncles very silky 2. *bracteata*.

Flowers 1 or 6 in. across, solitary or fascicled on the old wood; sepals glabrous; leaves oblong-lanceolate, serrate:—

Flowers white, solitary, 6 in. across, terminal, appearing with the leaves; leaves under 1 ft. long 3. *indica*.

Flowers yellow, clustered on nodes of the old wood, 1 in. across, appearing before the leaves; leaves often 2 ft. long 4. *pentagyna*.

1. DILLENIA RETUSA, Thunb.; F. B. I. i. 37; W. & A. 6.
Wormia bracteata, Bedd. Fl. t. 115 (not of Wight).

Forests of the Bolampatti and Anamalai Hills in Coimbatore District.

A large and ornamental tree, scarce in the Peninsula.

2. DILLENIA BRACTEATA, Wt. Ic. t. 358; F. B. I. i. 37.

Dry forests of the Nilgiris, Mysore, North Arcot and Chingleput, not common.

3. DILLENIA INDICA, Linn.; F. B. I. i. 36. *D. speciosa*, Thunb.; W. & A. 5; Wt. Ic. t. 823; Bedd. Fl. t. 108.

Damp valleys of the hills of the N. Circars.

the Malabar Gháts; often cultivated in gardens and near temples.

A beautiful evergreen tree. Vern. *Hind.* Chalta; *Ur.* Rai; *Tel.* Pedda Kalinga; *Tam.* Uva; *Mal.* Syalita; *Mar.* Mota Karmal.

4. *DILLENIA PENTAGYNA*, Roxb. Cor. Pl. i. t. 20; F. B. I. i. 38; W. & A. 5; Bedd. Fl. t. 104.

Dry forests and grass lands in most Districts, common and conspicuous both in leaf and in flower.

A deciduous tree. Vern. *Ur.* Rai; *Tel.* Chinna Kalinga; *Tam.* Nai-tékku; *Mal.* Koddapanna.

Family III. MAGNOLIACEAE.

Trees or shrubs, sometimes climbing, often aromatic. *Leaves* alternate, entire or rarely toothed; stipules convolute or 0. *Flowers* axillary and terminal, sometimes unisexual, white yellow or red, often showy and fragrant. *Sepals* and *petals* similar, very deciduous, arranged in whorls of 8. *Stamens* very numerous or rarely as few as 5, hypogynous, filaments free or monadelphous; anthers adnate, basifixed, dehiscing longitudinally. *Carpels* indefinite, free or cohering to an elongated axis or in one whorl; styles usually short, stigmatose on the inner surface; ovules anatropous or amphitropous, 2 or more on the ventral suture. *Fruit* baccate, follicular or of woody dehiscent carpels which are sometimes arranged in a cone. *Seeds* 1 or few, sometimes pendulous from a long funicle; testa single and crustaceous or double with the outer part fleshy; albumen granular or fleshy and oily; embryo minute; cotyledons spreading; radicle short, blunt, next the hilum.

Trees with perfect flowers and oblong spikes of leathery dehiscent carpels 1. **Michelia**,
Climbers with unisexual flowers and globular fleshy fruits...2. **Kadsura**,

1. *Michelia*, Linn.

Trees. *Leaves* evergreen or deciduous, enveloped in bud in their connate, convolute stipules. *Flowers* solitary, axillary or terminal. *Sepals* and *petals* similar, 9-15 or more, in 3 or more rows. *Stamens* numerous, many-seriate, with flat filaments.

anthers adnate, introrse. *Carpels* in a loose stalked spike; stigma decurrent; ovules 2 or more. *Fruit* a lax or dense spike of coriaceous dorsally dehiscent carpels. *Seeds* pendulous from the carpels by a long thread; outer wall of testa fleshy; albumen oily.

Leaves more than 4 in. long, gradually narrowed upwards from below the middle; flowers yellow 1. *Champaca*.
Leaves 2-4 in. long, shortly acuminate; flowers white, sometimes with a tinge of yellow 2. *nilagirica*.

1. *MICHELIA CHAMPACA*, Linn.; F. B. I. i. 42; W. & A. 6; King Ann. Calc. iii. 216, t. 64; Brand. For. Fl. t. 1.

Evergreen forests of the W. Gháts, in Mysore, Coorg, the Anamalais and Pulneys and Travancore; perhaps also occasionally in the hills of the N. Circars; elsewhere much cultivated, especially about temples for the sake of its flowers.

A tall evergreen tree with a valuable yellowish wood. Vern. *Hind.* Champa; *Tel.* Champakam; *Tam.* Shembuga, Chambugam.

2. *MICHELIA NILAGIRICA*, Zenk.; F. B. I. i. 44; Wt. Ic. t. 938; Bedd. Fl. t. 62; King Ann. Calc. iii. 216, t. 65.

Shola forests of the Nilgiris, Anamalais and Pulneys above 5,000 ft.

A handsome tree with a yellowish wood, valuable for carpentry work. Vern. *Tam.* Shembuga.

2. *Kadsura*, Kaempfer.

Climbing glabrous shrubs. *Leaves* exstipulate. *Flowers* unisexual, white, yellow or reddish, axillary or in the axis of scales near the base of short lateral leafy branches or from the old wood. *Sepals* and *petals* 9 to 12 in all, imbricate in about 3 rows. *Male flowers* with 5-15 or more *stamens* in a spiral series; filaments very short, free or subconnate, often fleshy; anthers free or partly immersed in a fleshy head of confluent filaments; cells small distant. *Female flowers* with many densely imbricated ovaries; stigmas sessile; ovules 2-4. *Fruit* a globose head of indehiscent fleshy 1-seeded carpels. *Seeds* 1-2, suspended; albumen fleshy; testa crustaceous; embryo minute.

KADSURA ROXBURGHIANA, Arn.; F. B. I. i. 45; King Ann. Calc. iii. 222, t. 73A. *K. Wightiana*, Arn.; F. B. I. i. 45.

Petals roundish, concave, outer larger; berries cuneate globose, scarlet.

Forests of the W. Gháts, in Malabar.

Family IV. ANONACEAE.

Trees or shrubs often climbing and frequently aromatic. *Leaves* alternate, simple, entire, penninerved, more or less distichous; stipules 0. *Flowers* 2- or rarely 1-sexual, greenish purple, red, brown, or yellow. *Sepals* 3 or rarely 2, free or connate. *Petals* 6, usually thick and fleshy, generally biseriate, hypogynous, valvate or slightly imbricate, the inner sometimes absent, very rarely coherent. *Stamens* many, closely packed on the torus or rarely few in one whorl; filaments short or 0; anthers adnate, bilocular with dorsal or lateral, contiguous or distant cells, with longitudinal dehiscence; connective produced into an oblong or truncate head. *Carpels* numerous or rarely few or solitary, distinct or rarely coherent with distinct stigmas, sessile on the top of the torus; styles short or 0; ovules one or more, anatropous. *Fruit* of 1 or more distinct sessile or stalked 1- or many-seeded, usually indehiscent, carpels or rarely of several carpels cohering together in a 1- or many-locular, dry or fleshy, dehiscent or indehiscent fruit. *Seeds* with abundant ruminant albumen and a minute basal embryo with divaricate cotyledons.

Petals imbricate in bud (Tribe i. **UVARIEAE**):—

Stamens with connectives produced and not concealing the anthers; trees.....1. **Sageraea**.

Stamens with anthers concealed by the overlapping connectives; climbing shrubs.....2. **Uvaria**.

Petals valvate or open in bud:—

Anther-cells concealed by the overlapping connectives:—

Outer petals spreading, flat or only concave at the base:—

Inner petals spreading like the outer or none (Tribe ii. **UNONEAE**):—

Petals bent in at the base over the stamens and ovaries, then spreading:—

Peduncles not hooked, carpel 1, many-ovuled

3. **Cyathocalyx**.

Peduncles hooked, carpels many, 1-2-ovuled...4. **Artabotrys**.

Petals flat, spreading from the base:—

Ovules 2–6, in one row on the ventral suture; carpels 2- or more-seeded.....5. **Unona.**

Ovules 1 or 2, basal; carpels baccate, 1-seeded...6. **Polyalthia.**

Inner petals dissimilar to the outer, arching over the stamens and ovaries and meeting at their tips (Tribe iii. **MITREPHOREAE**):—

Inner petals without claws:—

Inner petals as large as the outer but not larger, tomentose outside 7. **Popowia.**

Inner petals much larger than outer, glabrous

8. **Phacanthus.**

Inner petals clawed and connivent in a vaulted cone:—

Ovules 1 or 2; largest leaves 6–11 inches, smooth

9. **Goniothalamus.**

Ovules 4 or more; largest leaves 4–5 inches, reticulate

10. **Mitrephora.**

Outer petals thick, rigid, connivent; inner similar but smaller or 0 (Tribe iv. **XYLOPIAE**):—

Fruit of confluent carpels, fleshy, globose 11. **Anona.**

Fruit of distinct spreading carpels 12. **Xylopia.**

Anther-cells not concealed by the overlapping connectives (Tribe v. **MILJUSEAE**):—

Outer petals shorter than inner:—

Inner petals flat, or if a little pouched then glabrous; ovules definite (1–2); leaves glabrous or, if tomentose, inner petals glabrous within 13. **Milusa.**

Inner petals pouched at base, pubescent on both surfaces; ovules 6 or more; leaves tomentose 14. **Saccopetalum.**

Outer petals equal to inner; ovules 4–8 15. **Alphonsea.**

Outer petals longer than inner; ovules 2–4.....16. **Orophea.**

1. **Sageraea**, Dalz.

Trees. *Leaves* shining and branches glabrous. *Flowers* small, terminal, axillary or fascicled on woody tubercles, 1–2-sexual. *Sepals* orbicular or ovate, imbricate. *Petals* 6, imbricate in 2 rows, nearly equal, usually orbicular, concave. *Stamens* 6–21, imbricate in 2 or more series, broadly oblong, thick, fleshy; anther cells dorsal, oblong; connectives produced, not concealing the anthers. *Ovaries* 3–6; style short, stigma obtuse or capitate; ovules 1–8 on the ventral suture. *Fruit* of stalked globose carpels.

Larger petals 25 in. long; stamens about 25; leaves 5-7 in. long

1. *Dalzellii*.

Larger petals 5 in. long; stamens about 12; leaves 9-12 in. long

2. *grandiflora*.

1. *SAGERAEA DALZELLII*, Bedd. Ic. t. 42. *Bocagea Dalzellii*, Hook. f. & Th.; F. B. I. i. 92 in part.

Moist forests of W. Gháts in Malabar, the Anamalais, Travancore and Tinnevely, up to 2,000 ft.

An evergreen tree with black bark. Vern. *Mal.* Manja nára, Kápa Kaitha.

2. *SAGERAEA GRANDIFLORA*, Dunn in Kew Bull. 1914, 182.

Forests of Travancore.

2. *Uyaria*, Linn.

Scandent or straggling shrubs, usually stellately pubescent. *Inflorescence* terminal or leaf opposed or rarely axillary. *Flowers* solitary, cymose, umbellate or fascicled, yellow, purple or brown. *Sepals* 3, valvate, often connate below. *Petals* 6, orbicular, oval or oblong, imbricate in 2 rows, sometimes connate at the base. *Stamens* indefinite; top of connective ovoid-oblong, truncate or subfoliaceous, concealing the anthers. *Torus* depressed, pubescent or tomentose. *Ovaries* indefinite, linear-oblong; style short, thick; ovules many, 2-seriate, rarely few- or 1-seriate. *Fruit* of many dry or baccate, few- or many-seeded carpels.

Leaves, twigs, calyx and petals stellate-tomentose:—

Calyx smooth and soft.....1. *Hamiltonii*.

Calyx granular:—

Calyx globose splitting irregularly.....2. *eucineta*.

Calyx of 3 acuminate sepals.....3. *macropoda*.

Leaves glabrous:—

Leaves 2-2-3 in. long; flowers 6-8 in. across; carpels subsessile, blunt at both ends.....4. *zeylanica*.

Leaves 3-9 in. long; flowers 1-1.5 in. across, yellow; carpels on slender pedicels, red.....5. *Narum*.

1. *Uyaria Hamiltonii*, Hook. f. & Thoms.; F. B. I. i. 48; King Ann. Calc. iv. 17, t. 6.

Hill forests of Ganjam, up to 2,000 ft.

2. *UVARIA EUCINCTA*, Bedd. ex Dunn in Kew Bull. 1914, 182.

Hill forests of Ganjam, about 2,000 ft.

3. *UVARIA MACROPODA*, Hook. f. & Thoms.; Bedd. Ic. t. 79; F. B. I. i. 50; King Ann. Calc. iv. 27, t. 20.

Hill forests of Ganjam, about 2,000 ft.; hills of S. Arcot.

4. *UVARIA ZEYLANICA*, Linn.; F. B. I. i. 51; Bedd. Ic. t. 78; King Ann. Calc. iv. 26, t. 19. *U. Heyneana*, W. & A. 8.

Forests of the W. Gháts, in the Anamalais, Pulneys and Travancore.

5. *UVARIA NARUM*, Wall.; F. B. I. i. 50; W. & A. 9; Wight Ill. i. t. 6; King Ann. Calc. iv. 27, t. 21. *U. Hookeri*, King Ann. Calc. iv. 28, t. 22.

Forests of the W. Gháts, from S. Canara to Travancore; hills of Salem, up to 4,000 ft.; common.

3. *Cyathocalyx*, Champ.

Trees. *Leaves* glabrous. *Flowers* in terminal or leaf-opposed fascicles. *Sepals* combined into a 3-lobed cup or nearly free. *Petals* in 2 whorls of 3 each, valvate, arching at the base over the stamens and pistils but above them flat and spreading. *Stamens* numerous, cuneate, truncate; anther-cells linear, dorsal. *Ovaries* usually solitary on a concave torus; stigma large peltate; ovules many. *Ripe carpels* large globose berries.

CYATHOCALYX ZEYLANICUS, Champ.; Bedd. Ic. t. 47; F. B. I. i. 53; King Ann. Calc. iv. 36, t. 42.

Moist forests on the slopes of the W. Gháts in S. Canara, Malabar, Anamalais and Travancore, up to 3,000 ft.

A moderate-sized evergreen tree.

4. *Artabotrys*, R. Br.

Climbing or straggling shrubs. *Leaves* shining. *Flowers* solitary or fascicled, usually on woody hooked recurved branches (peduncles). *Sepals* 3, valvate. *Petals* 6, in 2 whorls, bases concave, connivent, spreading above, limb flat, subterete or clavate. *Stamens* oblong or cuneate; connective truncate or produced, concealing the dorsal anther-cells. *Torus* flat or convex. *Ovaries* few or many; style oblong or columnar; ovules 2, erect, collateral. *Fruit* a circle of usually yellow, sometimes

Leaves oblong-lanceolate; mature petals yellow, thinly adpressed-silky; fruit orange 1. *odoratissimus*.

Leaves oval-oblong; mature petals tomentose 2. *zeylanicus*.

1. ARTABOTRYS ODORATISSIMUS, R. Br.; F. B. I. i. 54; W. & A. 10; King Ann. Calc. iv. 44, t. 55.

Cultivated in gardens, especially on the W. Coast, the flowers very fragrant. King considers it truly wild in S. India.

2. ARTABOTRYS ZEYLANICUS, Hook. f. & Thoms.; F. B. I. i. 54; Bedd. Ic. t. 48; King Ann. Calc. iv. 48, t. 58.

Evergreen forests of the W. Coast and W. Gháts, S. Canara to Travancore.

5. Unona, Linn.

Trees or shrubs, erect or climbing. *Flowers* often solitary, axillary, terminal or leaf-opposed. *Sepals* 3, valvate. *Petals* 6, valvate or open in aestivation, 2-seriate; 3 inner sometimes absent. *Torus* flat or slightly concave. *Stamens* cuneate; anther-cells linear, extrorse; top of connective subglobose or truncate, concealing the anthers. *Ovaries* numerous; style ovoid or oblong, recurved, grooved; ovules 2-8, 1-seriate (rarely sub-2-seriate). *Fruit* a ring of many carpels, elongate or constricted between the seeds or baccate. *Seeds* few or many.

A small tree. Flowers subsessile; petals oblong-lanceolate, densely tomentose, glabrescent; carpels sessile or subsessile; leaves lanceolate, dark green, nerves sunk above, raised beneath:—

Carpels soft, velvety, globose 1. *pannosa*.

Carpels solid, glabrescent, slightly torulose 2. *Ramarowii*.

Flowers on slender peduncles; petals linear or narrowly lanceolate, slightly silky; carpels glabrous, stalked:—

A large climber. Young shoots rufous; petals narrow-lanceolate; sepals over .75 in. long; peduncle with a cordate bract...3. *viridiflora*.

A large shrub. Young shoots glabrous; petals narrow-linear; sepals less than .5 in. long 4. *Lawii*.

1. UNONA PANNOSA, Dalz.; F. B. I. i. 58; Bedd. Ic. t. 52; King Ann. Calc. iv. 55, t. 72.

Forests of the W. Gháts in Malabar, Anamalais, Travancore and Tinnevely, at 2,000 to 4,500 ft.

2. *UNONA RAMAROWII*, Dunn in Kew Bull. 1914, 183.

Forests of the W. Gháts from S. Canara to Travancore, up to 4,000 ft.

3. *UNONA VIRIDIFLORA*, Bedd. Ic. t. 158; F. B. I. i. 60; King Ann. Calc. iv. 56, t. 75.

Anamalai Hills, banks of Sholayar river, at 3,000 ft., scarce.

4. *UNONA LAWII*, Hook. f. & Thoms.; F. B. I. i. 59; Bedd. Ic. t. 73; King Ann. Calc. iv. 57, t. 77A.

Forests of the W. Gháts in Mysore, Wynaad, Travancore and Tinnevely, at 2,000 to 3,000 ft.

6. *Polyalthia*, Blume.

Trees or erect or climbing shrubs. *Flowers* solitary or fascicled, axillary, terminal, leaf-opposed or below the leaves on the young or old wood. *Sepals* free, valvate or subimbricate. *Petals* 6, 2-seriate, ovate or elongated, flat or the inner vaulted. *Torus* convex. *Stamens* cuneate; anther-cells extrorse, remote, concealed below the overlapping connectives. *Ovaries* indefinite; style usually oblong; ovules 1-2, basal and erect or sub-basal and ascending. *Fruit* a ring of one-seeded berries.

Flowers in fascioles, umbels or cymes:—

Flowers green, in fascicles or umbels; petals 7-1 in. long; leaves narrow-lanceolate, 7-9 in. long, margins undulate 1. *longifolia*.

Flowers yellow, in cymes; petals 1.5 in. long; leaves elliptic; nerves close, numerous, ascending; carpels ash-coloured 2. *fragrans*.

Flowers solitary, occasionally many, on tubercles of the trunk, but then not closely fascioled:—

Leaves glabrous or nerves puberulous beneath:—

Leaves attenuate or acuminate at top:—

Leaves 2.5-3.5 in. long, boldly reticulate 3. *Korinti*.

Leaves up to 8.5 in. long, slightly reticulate; nerves ascending, 12-16 pairs:—

Leaves gradually attenuate; twigs glabrous; petals greenish-yellow, over 1 in. long 4. *coffeoides*.

Leaves acuminate; twigs rufous-pubescent; petals 5 in. long

5. *rufescens*.

Leaves rounded at top or very obtuse; nerves spreading; bark corky; flowers pale green or yellow; berries purple 6. *suberosa*.

Leaves pubescent below, acute or acuminate, nerves ascending; flowers green; berries red 7. *cerasoides*.

1. *POLYALTHIA LONGIFOLIA*, Hook. f. & Thoms.; F. B. I. i. 62; Bedd. Fl. t. 38. *Guatteria longifolia*, Wall.; W. & A. 10; Wt. Ic. t. 1; King Ann. Calc. iv. 72, t. 99.

Cultivated in gardens and avenues and near temples, native of Ceylon.

A handsome evergreen tree, easily recognized. Vern. *Hind.* Asok, Devidari; *Tam.* Assothi; *Mal.* Choruna.

2. *POLYALTHIA FRAGRANS*, Bedd. Ic. t. 54, and Fl. t. 74; F. B. I. i. 63; King Ann. Calc. iv. 72, t. 100A.

Forests of the W. Gháts in S. Canara, Malabar, Anamalais and Travancore, up to 4,000 ft.

A tall, straight, handsome tree, the wood used on the W. Coast for the masts of native craft. Vern. *Tam.*, *Mal.* Nedunar.

3. *POLYALTHIA KORINTI*, Hook. f. & Thoms.; F. B. I. i. 64; King Ann. Calc. iv. 79, t. 110A. *Guatteria Korinti*, Dunal; W. & A. 10; Wt. Ic. t. 398.

Forests of the E. Gháts and hills from Vizagapatam southwards to Tinnevely and Travancore.

A spreading shrub, scarce.

4. *POLYALTHIA COFFEOIDES*, Hook. f. & Thoms.; F. B. I. i. 62; King Ann. Calc. iv. 67, t. 91.

Forests of the W. Gháts in S. Canara, Coorg, Malabar, Nilgiris and Travancore, up to 4,000 ft.

A handsome evergreen tree with straight trunk, conspicuously studded with the flower-tubercles, the leaves coming out red at first. Vern. *Tam.* Nedunarai; *Mal.* Villa.

5. *POLYALTHIA RUFESCENS*, Hook. f. & Thoms.; F. B. I. i. 66; King Ann. Calc. iv. 83, t. 113 (tris).

W. Coast forests in Cochin and Travancore.

A tree with tomentose branches, scarce.

6. *POLYALTHIA SUBEROSA*, Hook. f. & Thoms.; F. B. I. i. 65; King Ann. Calc. iv. 64, t. 77B. *Uvaria suberosa*, Roxb. Cor. Pl. i. t. 34. *Guatteria suberosa*, DC.; W. & A. 10.

Dry forests of the N. Circars and E. Gháts from Ganjam southwards, also in the Deccan forests of Kurnool, Mysore and Coimbatore, and occasionally on the W. Coast.

A small evergreen corky-barked tree or large shrub, very common, except on the west side. Vern. *Ur.* Karadi; *Tel.* Chilka dúdúga.

7. *POLYALTHIA CERASOIDES*, Hook. f. & Thoms.; F. B. I. i. 63; Bedd. Fl. t. 1; King Ann. Calc. iv. 65, t. 86B. *Uvaria cerasoides*, Roxb. Cor. Pl. i. t. 33. *Guatteria cerasoides*, W. & A. 10.

Forests of almost all Districts, especially in the N. Circars and Deccan, up to 3,000 ft., less common in the W. Gháts. An evergreen tree. Vern. Mar. Hoom; Tel. Gutti; Tam. Naktisi.

7. *Popowia*, Endl.

Trees. *Flowers* small, subglobular, opening but slightly, usually hermaphrodite, sometimes polygamous, extra-axillary or leaf-opposed. *Sepals* 3, ovate, valvate. *Petals* 6, valvate, in two whorls (the inner series very rarely imbricate), more or less orbicular; outer, like the sepals, spreading; inner thick, concave, connivent, acute, the tip sometimes inflexed. *Stamens* indefinite or subdefinite, short, cuneate; anther-cells hidden beneath the overlapping connectives, dorsal, remote. *Carpels* about 6, ovoid; style large, oblong or subclavate, straight or recurved; ovules 1-2 on the ventral suture, rarely 1 basal erect. *Fruit* a ring of stalked, globose or ovoid berries.

POPOWIA BEDDOMEANA, Hook. f. & Thoms.; F. B. I. i. 68; King Ann. Calc. iv. 119, t. 160B. *P. ramosissima*, Bedd. Ic. t. 75.

A small tree; leaves 2-3 in. long, glabrous, granulate beneath; flowers small, solitary; petals tomentose without.

Evergreen forests of the W. Gháts in S. Travancore and Tinnevely, at 3,000 to 5,000 ft. A small tree, scarce.

8. *Phaeanthus*, Hook. f. & Thoms.

Trees or climbers. *Flowers* solitary, terminal or in extra-axillary fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate, in 2 whorls; outer small, like the sepals; inner large, flat, coriaceous. *Stamens* numerous, oblong or quadrate, truncate; anther-cells dorsal, distant. *Carpels* numerous; styles cylindric or clavate, sometimes grooved ventrally. *Ovules* 1-2, sub-basal, ascending. *Fruit* of stalked, 1-2-seeded carpels

PHAEANTHUS MALABARICUS, Bedd. Ic. t. 76; F. B. I. i. 72; King Ann. Calc. iv. 154, t. 201B.

A small tree; leaves glabrous except the midrib below,

oblong-lanceolate, taper-pointed; flowers 5-7 in. across, red.

Forests of the W. Gháts, in Wynaad at about 2,000 ft., abundant about Tambachari Ghát (Bedd.).

9. *Goniotalamus*, Blume.

Trees or shrubs. *Leaves* with small nerves, forming intra-marginal loops. *Flowers* solitary or fascicled, axillary or extra-axillary; peduncles with basal scaly distichous bracts. *Sepals* 3, valvate. *Petals* 6, valvate, in two whorls; outer thick, flat or nearly so; inner smaller, shortly clawed, cohering in a vaulted cap over the stamens and ovary. *Stamens* many, linear-oblong; anther-cells remote, dorsal, hidden by the connective, which is produced into an oblong or truncate process. *Ovaries* many; style simple or 2-fid; ovules solitary or 2 (or rarely 4), superposed, sub-basal. *Fruit* of many 1-seeded carpels.

Outer petals softly brownish pubescent on both sides; stigma 2-fid:—

Outer petals clawed, hooded; leaves oblong, 6-9 in. long; small tree
1. *cardiopetalus*.

Outer petals ovate, flat; leaves linear-lanceolate, 3-8 in. long; small tree
2. *Wightii*.

Outer petals subglabrous; stigma entire or 2-lobed:—

Style subulate; leaves oblong-lanceolate, 3.5-6 in. long; veins obscure; small trees:—

Petals less than twice as long as the sepals; anthers beaked
3. *rhynchantherus*.

Petals five times as long as the sepals; anthers truncate
4. *Thwaitesii*.

Style 2-lobed; leaves 8-11 in. long; veins prominent beneath; shrub or tree
5. *wynaadensis*.

1. *GONIOTHALAMUS CARDIOPETALUS*, Hook. f. & Thoms.; F. B. I. i. 75; Bedd. Ic. t. 62; King Ann. Calc. iv. 93, t. 129.

W. Gháts in S. Canara, Coorg, Wynaad, Anamalais; Shevaroy Hills, at 2,500 to 4,000 ft.

2. *GONIOTHALAMUS WIGHTII*, Hook. f. & Thoms.; F. B. I. i. 76; Bedd. Ic. t. 63; King Ann. Calc. iv. 92, t. 122b.

W. Gháts in the Anamalais, Travancore and Tinnevely at 3,000 to 5,000 ft., in evergreen forests.

3. *GONIOTHALAMUS RHYNCHANTHERUS*, Dunn in Kew Bull. 1914, 182.

W. Gháts, in Tinnevelly and Travancore, in dense forest.

4. *GONIOTHALAMUS THWAITESII*, Hook. f. & Thoms.; F. B. I. i. 72; Bedd. Ic. t. 58; King Ann. Calc. iv. 88, t. 121.

W. Gháts of S. Travancore and Tinnevelly at 2,000 to 4,000 ft., in moist forests.

5. *GONIOTHALAMUS WYNAADENSIS*, Bedd. Ic. t. 61; F. B. I. i. 74; King Ann. Calc. iv. 92, t. 128.

W. Gháts, in Wynaad about Devala and Cherambadi, at 2,500 to 3,500 ft.

10. *Mitrephora*, Blume.

Trees. *Leaves* coriaceous, strongly nerved, plaited in veneration. *Flowers* usually terminal or leaf-opposed, sometimes 1-sexual. *Sepals* 3, orbicular or ovate. *Petals* 6, 2-seriate, valvate; outer ovate, thin veined; inner clawed, vaulted and cohering. *Stamens* oblong-cuneate; anther-cells dorsal, remote, the connectives broadly truncate at the apex, hiding the anther-cells. *Ovaries* oblong; style oblong or clavate, ventrally furrowed; ovules 4 or more, 2-seriate. *Fruit* of globose or ovoid, stalked or sessile, carpels.

A large tree. Leaves with woolly tufts in the forks of the nerves beneath, 4-5 in. long; stigma club-shaped; flowers 2-3 in. across, outer petals white, inner spotted with crimson.....1. *grandiflora*.

A small tree. Leaves glabrous, 2-4 in. long; stigma globular, sessile; flowers 1.5 in. across, yellow 2. *Heyneana*.

1. *MITREPHORA GRANDIFLORA*, Bedd. Ic. t. 101, and Fl. t. 75; F. B. I. i. 78; King Ann. Calc. iv. 112, t. 155.

Forests of the W. Gháts in S. Canara, at about 2,000 ft., Mysore and Wynaad.

2. *MITREPHORA HEYNEANA*, Thwaites; F. B. I. i. 77; Bedd. Ic. t. 77; King Ann. Calc. iv. 113, t. 152B. *Uvaria lutea*, β W. & A. 8.

Forests of the W. Gháts in the Nilgiris, Pulneys, Travancore and Tinnevelly, near the base of the hills, and up to 2,000 ft.

11. *Anona*, Linn.

Trees or shrubs. *Flowers* solitary or fascicled, terminal or leaf-opposed. *Sepals* 3, small, valvate. *Petals* 3-6, valvate, in 2

whorls, or the inner whorl wanting; outer triquetrous, base concave. *Stamens* numerous; anther-cells narrow, dorsal, contiguous, hidden by the overlapping ovoid tops of connectives. *Ovaries* many, subconnate; style oblong; ovule 1, erect. *Fruit* many-celled, ovoid or globose, many-seeded.

Leaves obtuse, 2-3 in. long, glaucous beneath; nerves ascending; flower greenish; fruit green, ovoid, with projecting ovoid areoles. 1. *squamosa*. Leaves acuminate, 5-8 in. long, green beneath; nerves divergent; flowers pale green; fruit orange, subglobose, with flat, 5-cornered areoles

2. *reticulata*.

1. ANONA SQUAMOSA, Linn.; F. B. I. i. 78; W. & A. 7.

The West Indian "Sweet Sop," the "Custard Apple" of India.

Cultivated for its fruit, and now very widely spread in the vicinity of villages, temples and old forts. Vern. *Hind.* Sharipha, Sitaphal; *Tam.* Sita; *Tel.* Sita pandu.

2. ANONA RETICULATA, Linn.; F. B. I. i. 78; W. & A. 7.

The "Bullock's Heart" of India, the "Custard Apple" of the West Indies, also sometimes occurs in a naturalized state.

12. Xylopia, Linn.

Trees or shrubs. *Leaves* coriaceous. *Flowers* axillary, supra-axillary, or on nodes below the leaves, solitary, cymose or fascicled; buds triquetrous, conic, often slender. *Sepals* 8, valvate, connate or free. *Petals* 6, elongate, valvate, in two whorls; outer flat or concave; inner nearly as long, 3-gonous, concave at the base only. *Torus* flat, or hollow and enclosing the carpels. *Stamens* oblong, truncate or connective produced; anther-cells hidden under overlapping connectives, remote or continuous, usually septate with a large pollen grain in each cellule. *Ovaries* 1 or more; style long, clavate; ovules 2-6 or more, 1-2-seriate. *Fruit* a ring of long or short, continuous or moniliform, usually several-seeded carpels.

XYLOPIA PARVIFOLIA, Hook. f. & Thoms.; F. B. I. i. 84; Bedd. Ic. t. 43, and Fl. t. 172; King Ann. Calc. iv. 145. t. 190A.

A lofty but slender buttressed tree with narrow sessile pubescent brown flowers; bracts longer than the sepals; leaves 2-8.5 in. long, reticulate.

Moist forests of Travancore up to 2,000 ft.



13. *Miliusa*, Lesch.

Trees or shrubs. *Flowers* 1-2[♂]sexual, green or red, axillary or extra-axillary, solitary fascicled or cymose. *Sepals* 8, small, valvate. *Petals* 6, valvate, in 2 series; outer smaller, like the sepals; inner cohering when young by the margins, at length free. *Torus* elongated, cylindric. *Stamens* definite or indefinite; anthers subdidymous, cells contiguous, ovoid, extrorse, connective hardly apiculate. *Ovaries* indefinite, linear-oblong; style oblong or very short; ovules 1-2 (-3-4). *Fruit* a ring of globose or oblong 1-many-seeded carpels.

A moderate-sized tree, the whole plant tomentose; flower stalks 2-4 in. long; inner petals yellowish, glabrous within, flat (not saccate) at base; fruit purple 1. *velutina*.

Leaves glabrous or pubescent only on the nerves beneath:—

A small tree; peduncles 1-1.5 in. long; carpels glabrous, on stalks 3-5 in. long; twigs early glabrous; stamens very numerous

2. *Wightiana*.

Shrubs; peduncles 3-8 in. long:—

Stamens very numerous; twigs pubescent or strigose; carpels short-stalked or sessile:—

Carpels grey-tomentose; twigs strigose 3. *eriocarpa*.

Carpels glabrous; twigs pubescent 4. *montana*.

Stamens 8-12; twigs glabrous; leaves narrow-lanceolate, nerves obscure 5. *nilagirica*.

1. *MILIUSA VELUTINA*, Hook. f. & Thoms.; F. B. I. i. 87; Bedd. Ic. t. 87, and Fl. t. 37; King Ann. Calc. iv. 158, t. 206.

Forests of the N. Circars from Ganjam to Godavari; Cuddapah District.

A common deciduous tree of the deciduous forests of N. and C. India, especially with Sál. It gives a useful wood.

Vern. *Hind*. Domsal.

2. *MILIUSA WIGHTIANA*, Hook. f. & Thoms.; F. B. I. i. 87; Bedd. Ic. t. 86; King Ann. Calc. iv. 156, t. 202B.

Forests of the W. Gháts in the Nilgiris, Coimbatore, Travancore and Tinnevely, up to 5,000 ft., evergreen.

3. *MILIUSA ERIOCARPA*, Dunn. *M. indica*, Hook. f. & Thoms.; F. B. I. i. 86 (var. *tomentosa*), (not of Lesch.); Bedd. Ic. t. 85.

Forests of the W. Gháts in Mysore, Travancore and Tinnevely; Hills of Salem.

4. *MILIUSA MONTANA*, Gardn.; Bedd. Ic. t. 84. *M. indica*, var. *montana*; Hook. f. & Thoms.; F. B. I. i. 86.

Forests of the W. Gháts in Malabar, Nilgiris, Anamalais and Tinnevely, up to 4,500 ft.; Cuddapah.

5. *MILIUSA NILAGIRICA*, Bedd. Ic. t. 88; F. B. I. i. 87; King Ann. Calc. iv. 156, t. 203A.

Forests of the W. Gháts in the Wynad, Nilgiris and Anamalais, at about 5,000 ft.

14. *Saccopetalum*, Benr.

Trees. *Leaves* deciduous. *Flowers* axillary, solitary or fascicled. *Sepals* 3, small, valvate. *Petals* 6, valvate, in 2 whorls; outer small, like the sepals; inner much larger, erect or conniving, base saccate. *Stamens* indefinite; anther-cells dorsal, contiguous, not concealed by the connective, which is produced into a conspicuous appendage. *Ovaries* indefinite; ovules 6 or more. *Fruit* a ring of subglobose carpels.

SACCOPETALUM TOMENTOSUM, Hook. f. & Thoms.; F. B. I. i. 88; Bedd. Ic. t. 49, and Fl. t. 39; Roxb. Cor. Pl. i. t. 35; King Ann. Calc. iv. 159, t. 207.

A large deciduous tree with twigs and under side of leaves tomentose; flowers in small leaf-opposed or terminal cymes, on pedicels 2-3 in. long; carpels large, globose, stalked, velvety brown.

Forests of the N. Circars, especially with Sál (Brandis); Hyderabad; W. Gháts from S. Canara to Tinnevely. Vern. *Ur. Gondapalasu*; *Kan. Hessare*.

15. *Alphonsea*, Hook. f. & Thoms.

Lofty or rarely small trees or occasionally erect or climbing shrubs. *Leaves* thick, coriaceous, glabrous and shining. *Flowers* small or middle-sized, in leaf-opposed rarely extra-axillary peduncled fascicles. Calyx with 3 small valvate *sepals* or cupular with 3 valvate teeth. *Petals* 6, valvate, in 2 whorls, larger than the sepals, equal, or the inner rather smaller. *Torus* cylindric or hemispheric. *Stamens* indefinite, loosely packed; anthers dorsal, contiguous, not concealed by the apiculate connective. *Ovaries*

in two series on the ventral suture. *Fruit* a ring of sessile or stalked carpels.

Leaves glabrous:—

Petals .25 in. long; leaves obtuse:—

Leaves ovate; carpels smooth 1. *madraspatana*.

Leaves lanceolate; carpels muricate 2. *sclerocarpa*.

Petals .5 in. long; leaves caudate-acuminate 3. *zeylanica*.

Leaves tomentose below; flowers .5 in. long, reddish green; carpels tomentose, yellow 4. *lutea*.

1. ALPHONSEA MADRASPATANA, Bedd. Ic. t. 92, and Fl. t. 76; F. B. I. i. 89; King Ann. Calc. iv. 165, t. 214A.

Forests of the E. Gháts, in ravines and by streams in Vizagapatam, Cuddapah and N. Arcot, up to 3,000 ft.

2. ALPHONSEA SCLEROCARPA, Thw.; F. B. I. i. 89; King Ann. Calc. iv. 166, t. 215A.

Forests of the W. Gháts, in Nilgiris, Malabar, Anamalais, Pulneys and Tinnevely, up to 2,000 ft.

3. ALPHONSEA ZEYLANICA, Hook. f. & Thoms.; F. B. I. i. 89; Bedd. Ic. t. 90; King Ann. Calc. iv. 166, t. 214B.

Evergreen forests of Travancore and Tinnevely, at 2,000 to 3,000 ft.

4. ALPHONSEA LUTEA, Hook. f. & Thoms.; F. B. I. i. 89; Bedd. Ic. t. 91; King Ann. Calc. iv. 162, t. 209. *Uvaria lutea*, Roxb. Cor. Pl. i. t. 36.

Eastern slopes of Nilgiris below Coonoor, at 2,000 ft.

16. Orophea, Blume.

Small trees or shrubs. *Flowers* usually small, axillary, solitary, fascicled or cymose. *Sepals* 3, valvate. *Petals* 6, valvate, in 2 whorls; outer ovate; inner clawed, usually cohering by their margins into a mitriform cap, sometimes oblong and slightly approximate below the middle, the apices divergent, not vaulted, rarely without claws and very rarely slightly imbricate. *Stamens* definite, 6–12, ovoid, fleshy; anther-cells dorsal, large, contiguous, not concealed by the connective, which is sometimes prolonged into a conical apical point, not truncate. *Staminodes* 0 or 3–6. *Ovaries* 3–15; style short or 0; ovules 4. *Fruit* a ring of 1- or

Outer petals, pedicels and young parts shaggy; carpels oblong, red.

1. *erythrocarpa*.

Outer petals and young parts pubescent or glabrous; carpels globose:—

Pedicels under 1 in. long, in nearly sessile clusters 2. *Thomsoni*.

Pedicels more than 2 in. long:—

Buds and young shoots shortly tomentose; stamens 6... 3. *zeylanica*.

Buds and young shoots glabrous; leaves 1.5–2.5 in. long, ovate; stamens 12 4. *uniflora*.

1. *OROPHEA ERYTHROCARPA*, Bedd. Ic. t. 68; F. B. I. i. 91; King Ann. Calc. iv. 103, t. 145A.

Forests of the W. Gháts in the Anamalais and Travancore, up to 2,000 ft.

2. *OROPHEA THOMSONI*, Bedd. Ic. t. 67; F. B. I. i. 91; King Ann. Calc. iv. 103, t. 144B.

Forests of the W. Gháts in the Anamalais and down to Tinnevely, up to 2,500 ft.

3. *OROPHEA ZEYLANICA*, Hook. f. & Thoms.; F. B. I. i. 90; Bedd. Ic. t. 70; King Ann. Calc. iv. 104, t. 146B.

Coorg and Mysore.

4. *OROPHEA UNIFLORA*, Hook. f. & Thoms.; F. B. I. i. 90; Bedd. Ic. t. 69; King Ann. Calc. iv. 102, t. 144A.

Forests of the W. Gháts from Coorg through Wynaad to Travancore and Tinnevely, up to 4,000 ft.

Family V. MENISPERMACEAE.

Climbing or twining shrubs or occasionally herbs, or very rarely erect shrubs or small trees. *Leaves* alternate, simple or very rarely compound, entire or lobed, usually palminerved, often peltate; stipules 0. *Flowers* dioecious, small, solitary, fascicled capitate or cymose or more frequently racemed or paniced, sometimes bracteate, occasionally 3-bracteolate. *Sepals* 6, in 2 whorls, or 9–12 in 3–4 whorls, rarely fewer than 6 and very rarely 5, outer often minute, occasionally all connate into a toothed or lobed cup. *Petals* never more than 6, rarely fewer, free or connate or 0. *Stamens* usually of the same number as, and opposite to, the petals; filaments free, with extrorse or vertically dehiscing anthers, or connate with anthers capitate or on the rim of a terminal disk; rudimentary carpels very small or 0. *Staminodes* 6 or 0;

terminal but often becoming basilar by the curvature of the ovary; ovules solitary or very rarely 2, ventral, usually amphitropous. *Ripe carpels* drupaceous, with the style-scar sub-basal or sometimes terminal, sessile or stalked. *Seed* solitary, usually reniform or horseshoe-shaped; albumen copious or 0, even or ruminant; cotyledons linear or broad, appressed or spreading.

Key to Male Specimens.

Flowers sessile, in globose solitary or racemed heads; stamens, 3 free, 3 connate 3. **Coscini**um.

Flowers stalked, or, if sessile, in panicled or umbelled heads; stamens all free or all connate:—

Stamens connate, anthers in a terminal head or ring:—

Flowers in stalked solitary or umbellate heads; anthers on the rim of a stalked disk 7. **Stephania**.

Flowers in panicles:—

Anthers in a globular head; petals 0 2. **Anamirta**.

Anthers in a ring; petals connate:—

Calyx campanulate 9. **Cyclea**.

Calyx of 4 spreading sepals 8. **Cissampelos**.

Stamens free:—

Leaves deeply cordate 1. **Tinospora**.

Leaves acute, obtuse, or subcordate at base:—

Flowers 1 in. long; anthers oblong, opening down the sides.

4. **Tiliacora**.

Flowers .05 in. long; anthers globose, opening across the top:—

Panicles up to 1 ft. long, drooping 5. **Diploclisia**.

Flowers in racemes, or short, erect panicles or axillary fascicles:—

Flowers in small fascicles or cymes 6. **Cocculus**.

Flowers in slender racemes 10. **Pachygone**.

Key to Female Specimens.

Style-scar terminal 1. **Tinospora**.

Style-scar basal:—

Flowers sessile, in globose solitary or racemed heads 3. **Coscini**um.

Flowers in a raceme of small cymes subtended by foliaceous cordate bracts; drupes hirsute 8. **Cissampelos**.

Flowers in compound umbels or panicles:—

Ovary solitary:—

Flowers in panicles 9. **Cyclea**.

Flowers in umbellate heads or in solitary condensed cymes

7. **Stephania.**

Ovaries 3-many :—

Drupe pedicelled on the receptacle :—

Leaf-blade rotund-cordate, acuminate, less than twice the petiole; petals 0 2. **Anamirta.**

Leaf-blade oblong-ovate, acute, seldom cordate, more than 4 times the petiole; petals 6, minute.....4. **Tiliacora.**

Drupe sessile on the receptacle :—

Drupe elongate, 1 in. long, panicles long, drooping

5. **Diploclisia.**

Drupe pisiform, under 3 in. :—

Flowers in short erect panicles or subsolitary; albumen fleshy.....6. **Cocculus.**

Flowers racemose; albumen 0 10. **Pachygone.**

1. **Tinospora, Miers.**

Climbing shrubs. Racemes or rarely panicles of usually precocious flowers, axillary terminal or from the old wood. *Sepals* 6, 2-seriate, inner larger. *Petals* 6, smaller. *Stamens* 6, free; anther-cells connivent at the thickened top of the filament, bursting longitudinally. *Staminodes* 6, clavate; ovaries 3; stigmas forked. *Drupe* ventrally flat, dorsally convex, round or oval; style-scar subterminal; endocarp rugose or tubercled, dorsally keeled, ventrally concave. *Seed* grooved ventrally or curved round a 2-lobed intrusion of the endocarp; albumen ventrally ruminant; cotyledons foliaceous, ovate, spreading.

TINOSPORA CORDIFOLIA, Miers; F. B. I. i. 97. *Cocculus cordifolius*, DC.; W. & A. 12; Wt. L. t. 485-6.

A climbing shrub with succulent stems, the bark papery at first then corky; leaves glabrous; flowers yellow, on nodes on the old wood; drupe red, sessile; endocarp with few isolated tubercles or smooth.

In forests and among trees in almost all Districts. Vern. *Hind.* Goluncha; *Tel.* Tippa tige; *Tam.* Chintil.

2. **Anamirta, Colebr.**

Climbing shrubs. Flowers bibracteolate, panicled. *Sepals* 6. *Petals* 0. *Stamens* capitate in many whorls on the top of the staminal column, 2-celled, bursting transversely. *Staminodes*

9, clavate, in 1 whorl; ovaries 3, on a short gynophore; stigmas subcapitate, reflexed. *Drupe* on a 3-fid gynophore, transversely or obliquely ovoid, somewhat compressed, dorsally gibbous; style-scar sub-basal; endocarp woody. *Seed* globose, embracing a subglobose hollow intrusion of the endocarp; albumen dense, of horny granules; embryo curved; cotyledons narrow-oblong, thin, spreading.

ANAMIRTÆ COCCULUS, W. & A. 446; F. B. I. i. 98. *Cocculus suberosus*, W. & A. 11.

A large climbing shrub with long panicles of greenish flowers drooping from nodes of the old wood; leaves broadly ovate, cordate, firm, glabrous except for small tufts in the principal nerve axils.

Deccan, in Cuddapah and Mysore; W. Ghâts in the Pulneys, Cochin and Travancore.

The source of the bitter drug "*Cocculus indicus*."

3. *Coscinium*, Colebr.

Climbing shrubs. *Flowers* bracteate, in dense globular solitary or racemose heads. *Sepals* 6, orbicular. *Petals* 3, large, spreading, elliptic. ♂ *Stamens* 6; outer 3 free, with 2-celled anthers; inner 3 connate, with 1-celled anthers; anthers bursting vertically. ♀ *Staminodes* 6; ovaries 3-6, subglobose; styles subulate, reflexed. *Drupe* globose; endocarp bony. *Seed* globose, embracing a globose intrusion of the endocarp; albumen fleshy, ruminant ventrally; embryo straight; cotyledons orbicular, spreading, thin, sinuate laciniate or fenestrate.

COSCINIUM FENESTRATUM, Colebr.; F. B. I. i. 99.

Young shoots and under side of leaves hoary; leaves oblong-deltoid; flowers green, in heads 5-8 in. across, borne on stalks 1 in. long; drupes 1-3, 5 in. in diam., subglobose, villous.

W. Ghâts, in the Nilgiris and Travancore.

4. *Tiliacora*, Colebr.

Climbing shrubs. *Flowers* dioecious or polygamous, in axillary panicles. *Sepals* 6, 2-seriate, the outer much smaller. *Petals* 6, minute, cuneate. ♂ *Stamens* 6; anthers adnate, bursting vertically; rudimentary carpels 3. ♀ *Ovaries* 3-12; styles short, subulate. *Drupe* obovoid, pedicelled, subcompressed; style-

scar sub-basal; endocarp thin, obscurely ribbed, grooved on both sides. *Seed* horseshoe-shaped; albumen oily, ruminate; cotyledons linear, fleshy, plano-convex, appressed.

TILIACORA ACUMINATA, Miers. *T. racemosa*, Colebr.; F. B. I.

i. 99. *Cocculus acuminatus*, W. & A. 12.

A large evergreen climbing shrub; leaves ovate to lanceolate, obtuse or cordate at base, glabrous; flowers yellow, in racemes or narrow panicles; drupes oblong, red.

In all Districts, common in hedges and among bushes, but sometimes in forests, when it climbs to the tree-tops.

5. Diploclisia, Miers.

Characters of *Cocculus* but flowers in long drooping panicles from the old wood and centre of endocarp reduced to a thin flat septum.

DIPLOCLISIA GLAUDESCENS, Diels in Engl. Pflanzenr. Menisperm. 225, t. 77. *Cocculus macrocarpus*, W. & A. 13; F. B. I. i. 101; Wt. Ill. i. t. 7.

A large climber; leaves round or broader than long, 5-nerved, glaucous beneath, 2-4 in. across, shorter than their petioles; flowers yellow; drupes reddish, obovoid, 1 in. long.

Forests of the W. Gháts in Malabar, Nilgiris, Pulneys and Travancore up to 3,000 ft.

6. Cocculus, DC.

Climbing or straggling or erect shrubs, or even trees. *Flowers* paniced or rarely fascicled in the axils of the leaves. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6, smaller than the sepals, usually auricled at the base. *Stamens* embraced by the petals; anthers subglobose, cells bursting transversely. *Staminodes* 6 or 0; ovaries 3-6; styles usually cylindric. *Drupe* compressed; endocarp horseshoe-shaped, dorsally keeled and tubercled, sides concave, but not reduced to a thin flat septum. *Seed* curved; albumen fleshy; embryo annular; cotyledons linear, flat, appressed.

Erect shrub or small tree; leaves strongly 3-ribbed, caudate-acuminate; flowers pale yellow; peduncles glabrous 1. *laurifolius*.

Climbing or straggling shrubs; leaves obtuse; peduncles densely pubescent:—

A woody climber; leaves narrowly elliptic, acute at base, subglabrous; ♂ flowers in axillary fascicles, ♀ subsolitary; sepals glabrous.....2. *pendulus*.

A bushy and scarcely woody climber; leaves ovate, obtuse at base, softly pubescent; flowers pale yellow, ♂ in short axillary panicles, ♀ 1-3, axillary; sepals pubescent; drupes purplish black

3. *hirsutus*.

1. *COCULUS LAURIFOLIUS*, DC.; F. B. I. i. 101.

Coimbatore, at Geddesala (A. W. Lushington); W. Gháts in the Anamalais and Travancore Hills at 5,000 to 7,000 ft.

2. *COCULUS PENDULUS*, Diels in Engl. Pflanzenr. Menisperm. 237. *C. Leaeba*, DC.; F. B. I. i. 102. *C. glabra*, W. & A. 18.

N. Circars in Ganjam; Deccan and Carnatic in Coimbatore, Madura and Tinnevely, in dry regions.

3. *COCULUS HIRSUTUS*, Diels l.c. 236. *C. villosus*, DC.; F. B. I. i. 101; W. & A. 13.

In almost all Districts, straggling over bushes and small trees, chiefly in rather dry localities and often near villages.

7. *Stephania*, Lour.

Climbing shrubs. Leaves often peltate. Heads of flowers in axillary stalked umbels or, rarely, solitary or cymose. ♂ Sepals 6-10, free, ovate or obovate; petals 3-5, obovate, fleshy; anthers 6, on the rim of the flattened top of the staminal column, bursting transversely. ♀ Sepals 3-5; petals as in ♂; staminodes 0; ovary 1; style 3-6-partite. Drupe glabrous; endocarp compressed, horseshoe-shaped, dorsally tubercled, sides concave, perforated. Seeds almost annular; cotyledons long, slender, semi-terete, appressed.

Heads of flowers in stalked umbels 1. *japonica*.
Male flowers in solitary axillary stalked heads; female flowers in condensed stalked cymes 2. *Wightii*.

1. *STEPHANIA JAPONICA*, Miers. *S. hernandifolia*, Walp.; F. B. I. i. 103. *Clypea hernandifolia*, W. & A. 14; Wt. Ic. t. 939.

Forests of the W. Gháts, common from Coorg to Tinnevely, up to 6,000 ft.

2. STEPHANIA WIGHTII, Dunn. *S. rotunda*, Hook. f. & Thoms.; F. B. I. i. 103 not of Lour. *Clypea Wightii*, Arn. in Wt. Ill. i. 22.

Forests of the W. Gháts, in Malabar, Nilgiris and Tinnevely.

8. Cissampelos, Linn.

Suberect or climbing shrubs. *Leaves* often peltate. *Flowers*: ♂ cymose; sepals 4 (-5-6), erose; petals 4, connate, forming a 4-lobed cup; anthers 4, connate round the flattened top of the staminal column, bursting horizontally; ♀ racemed, crowded in the axils of leafy bracts; sepals 2 (or sepal and petal 1 each), 2-nerved, adnate to the bracts; staminodes 0; ovary 1, style short, 3-fid or 3-toothed. *Drupe* ovoid, style-scar sub-basal; endocarp horseshoe-shaped, compressed, dorsally tubercled, sides excavated. *Seed* curved; embryo slender; cotyledons narrow, semi-terete, appressed.

CISSAMPELOS PAREIRA, Linn.; F. B. I. i. 103. *C. convolvulacea*, Willd.; W. & A. 14.

A more or less tomentose climber with rotund usually cordate leaves, about equal in length to their petioles. Flowers greenish. Bracts of female racemes often densely imbricate. Cymes of male flowers 1-2 in. long, decomposed. Drupes scarlet, hirsute.

In almost all Districts, very common.

9. Cyclea, Arn.

Climbing shrubs. *Leaves* usually peltate. *Flowers* in axillary panicles: ♂ Sepals 4-8, connate into a 4-5-lobed calyx; petals 4-8, more or less connate into a 4-5-lobed corolla; anthers 4-6, connate round the rim of the disk-like top of the staminal column, bursting horizontally; ♀ Calyx globose or campanulate, lobed; corolla globular; ovary 1, style short, 3-5-lobed, lobes radiating. *Drupe* ovoid; style-scar sub-basal; endocarp horseshoe-shaped, 2-locellate, dorsally tubercled, sides convex. *Seed* curved; cotyledons slender, semi-terete, appressed.

Calyx globose or broadly campanulate, lobes $\frac{1}{4}$ of tube; anther 6-8-celled.....1. *peltata*.

Calyx campanulate, lobes $\frac{1}{4}$ of tube; anthers 4-celled.....2. *Arnottii*.

Calyx campanulate, divided nearly to the base.....3. *fissicalyx*.

1. *CYOLBA PELTATA*, Diels (not of Hook. f. & Thoms.). *C. Burmanni*, Hook. f. & Thoms.; F. B. I. i. 104; Cooke Fl. Bomb. i. 28.

W. Ghâts from S. Canara to Tinnevely, up to 3,000 ft.; Hills of Mysore and N. Arcot, up to 3,000 ft.

2. *CYCLEA ARNOTTI*, Miers. *C. peltata*, Hook. f. & Thoms.; F. B. I. i. 104 (not *Menispermum peltatum*, Lam.).

W. Ghâts in S. Canara, Coorg, Wynaad, Nilgiris, Anamalais and Tinnevely Hills, up to 6,000 ft.

3. *CYCLEA FISSICALYX*, Dunn. *C. peltata*, Cooke Fl. Bomb. i. 24 (not of Hook f. & Thoms. nor of Diels).

Forests of Wynaad in Malabar.

10. Pachygone, Miers.

A climbing shrub. *Flowers* in axillary racemes. *Sepals* 6, in 2 whorls, outer smaller. *Petals* 6, much smaller, bases auricled and embracing the filaments. *♂ Stamens* 6, filament incurved, anthers subglobose, didymous, bursting transversely; rudimentary carpels 3, minute. *♀ Staminodes* 6; ovaries 3; styles stout, horizontal. *Drupe* reniform; style-scar sub-basal; endocarp reniform, rugulose. *Seed* horseshoe-shaped; albumen 0; cotyledons semi-terete, very thick, hard; radicle very short.

PACHYGONE OVATA, Miers; F. B. I. i. 105. *Cocculus Plukenetii*, DC.; W. & A. i. 14; Wt. Ic. t. 824, 825.

A large evergreen spreading shrub with long drooping or climbing branches and ovate blunt leaves. Flowers minute, white, honey-scented. *Drupe* 3 in. long.

Sandy sea-shores on the Coromandel Coast from Nellore to Tanjore and Tinnevely; Deccan in Bellary, Cuddapah and Mysore.

Family VI. BERBERIDACEAE.

Glabrous herbs or shrubs, sometimes climbing. *Leaves* 1-many-foliolate. *Stipules* petiolar or usually 0. *Flowers* hermaphrodite or rarely dichinous, regular, axillary, solitary or in simple or compound racemes; usually yellow or white, all members inserted on the receptacle. *Sepals* often petaloid, 3-9, in 1-3 whorls, imbricate or the outer rarely valvate. *Petals* equal in number to the sepals or twice as many, and, like them, caducous, nectariferous at the base or reduced to nectaries. *Stamens* (4-) 6 (-8)

opposite to the petals; filaments free or connate, sometimes irritable. *Anthers* bursting by two apical valves attached by their upper end or longitudinally. *Carpels* 1-3 (-9) distinct; stigma usually peltate; ovules many on a ventral suture, or few near the base, or covering the whole wall, usually anatropous. *Ripe carpels* berries or capsules, dehiscent or not.

Leaves simple 1. *Berberis*.
Leaves pinnate 2. *Mahonia*.

1. *Berberis*, Linn.

Erect shrubs with yellow wood. *Leaves* simple, fascicled in the axils of 3-5-partite or rarely simple spines. *Flowers* yellow, solitary fascicled racemose corymbose or paniced, with 2-3 small appressed bracteoles. *Sepals* 6, imbricate in 2 whorls. *Petals* 6, imbricate in 2 whorls, usually with 2 glands inside at the base. *Stamens* 6, free; anther-cells opening by recurved valves. *Ovary* simple; stigmas peltate, sessile or nearly so; ovules few, basal, erect. *Berries* few-seeded.

BERBERIS TINCTORIA, Lesch.; W. & A. 16.

An erect evergreen bush with pale brown shining twigs, prickly leaves, yellow flowers in panicles or corymbs, and glaucous spindle-shaped red berries with short stout styles.

Nilgiri and Pulney Hills of the W. Gháts, above 6,000 ft.; Shevaroy Hills of Salem.

2. *Mahonia*, Nutt.

Characters of *BERBERIS* but leaves pinnate with opposite leaflets, and stamens usually 2-toothed below the anther.

MAHONIA LESCHENAULTII, Takeda. *Berberis nepalensis*, var. *Leschenaultii*, Hook. f. & Thoms.; F. B. I. i. 109 *B. Leschenaultii*, Wall.; Wt. Ic. t. 940.

A shrub with stiff, erect, corky-barked stems; leaflets ovate-lanceolate, prickly; flowers yellow, in long erect racemes, fascicled among the upper leaves; berries globose, glaucous purple.

Hills of the W. Gháts from the Nilgiris southwards above

Family VII. NYMPHAEACEAE.

Aquatic perennial herbs. *Leaves* rising above, submerged in or usually floating on the water, often peltate, margins involute in bud. *Flowers* floating or rarely emergent, solitary on axillary peduncles. *Sepals* 3-5. *Petals* 3-5 or many. *Stamens* 6 or indefinite; all free and inserted on a fleshy torus surrounding or rarely enveloping the gynoecium. *Carpels* 3 or more, free or united or sunk in the pits of the torus; stigmas of the distinct carpels terminal and peltate, of many-carpelled ovaries as many as the carpels, adnate to the upper surface; ovules anatropous or orthotropous; few and pendent from the summit of the cell or many, covering the walls of the cells. *Fruit* of distinct indehiscent carpels or many-carpelled, fleshy or spongy. *Seeds* arilled or not; albumen floury, fleshy or rarely 0; embryo enclosed in the enlarged persistent embryo-sac.

Leaves floating; carpels connate into a many-celled ovary

1. Nymphaea.

Leaves raised above the water; carpels sunk in the torus

2. Nelumbium.**1. Nymphaea, Linn.**

Large perennial herbs. *Leaves* floating, usually peltate. *Flowers* large, floating, on long axillary peduncles. *Sepals* 4. *Petals* numerous, gradually passing into stamens. *Stamens* with petaloid filaments and small introrse anthers. *Carpels* sunk in the fleshy torus and with it forming a many-celled ovary crowned by the radiating stigmas; ovules very numerous, anatropous. *Fruit* a spongy many-seeded berry, ripening below the surface. *Seeds* minute, embedded in the pulp, enclosed in a sac-like aril.

Leaves entire or sinuate, glabrous on both sides; flowers blue, white, rose or purple 1. *N. stellata*.

Leaves sharply sinuate-toothed, densely pubescent beneath; flowers white or red 2. *N. pubescens*.

1. NYMPHAEA STELLATA, Willd.; F. B. I. i. 114; W. & A. 17; Wt. Ic. t. 178.

Tanks and ponds on the E. Coast from Madras to Tanjore, also in backwaters along the W. Coast.

2. *NYMPHAEA PUBESCENS*, Willd.; W. & A. 17. *N. Lotus*, Hook. f. & Thoms.; F. B. I. i. 114, (not of Linn.).

Ditches and tanks in most Districts both along the Coasts and on the Mysore plateau up to 3,000 ft.

2. *Nelumbium*, Juss.

A large erect herb, growing in shallow water from a stout creeping rootstock. *Leaves* when mature raised high above the water, peltate. *Flowers* rose white or yellow. *Sepals* 4-5. *Petals* and *stamens* numerous, all hypogynous and caducous; connective prolonged above the anther. *Ovaries*, many, 1-celled, sunk in pits on the flat top of the broadly turbinate torus; style very short, exserted; stigma terminal, peltate; ovules 1-2, pendulous. *Carpels* ovoid, loose in the cavities; pericarp bony, smooth. *Seed* filling the carpel; testa spongy; albumen 0; cotyledons fleshy, thick, enclosing the folded plumule.

NELUMBium SPECIOSUM, Willd.; F. B. I. i. 116; W. & A. 16.

Peduncles and petioles 3-6 ft. high; leaves 2-3 ft. across, glaucous, concave; fruiting torus 3-4 in. across; ripe carpels rather larger than peas.

In tanks and ponds in most Districts, especially in the hotter localities.

The sacred Lotus. Vern. *Hind.* Kanwal; *Tam.* Tamaray.

Family VIII. *PAPAYERACEAE*.

Herbs with milky or coloured juice, rarely watery. *Leaves* radical or alternate. *Flowers* terminal, solitary cymose or paniculate. *Sepals* 2-3, hypogynous, free or cohering in a cap, caducous. *Petals* 4, in 2 whorls, large, crumpled, rarely more or 0. *Stamens* very numerous, in many series, very rarely few; filaments thread-like; anthers basifixed, bursting by lateral slits. *Ovary* 1-celled, with 2 to many parietal placentas or these being sometimes prolonged, divided into many nearly complete cells; style short or 0; stigmas radiating, as many as the placentas, free or adnate to and crowning the flat top of the ovary; ovules anatropous, parietal. *Fruit* a 1-celled or by the intrusion of the parietal placentas a many-celled capsule, opening longitudinally by 2 or 4 valves or by pores at the top of and between the placentas. *Seeds* usually numerous, with oily or fleshy albumen;

Leaves and capsules quite glabrous; petals white pink or purple; stigmas adnate to the top of the capsule 1. **Papaver**.
 Leaves and capsules spiny; petals yellow; stigmas radiating from the top of a short style 2. **Argemone**.

1. **Papaver**, Linn.

Annual or perennial herbs with milky juice. *Leaves* variously lobed or cut. *Flowers* on long peduncles. *Ovary* 1-celled; stigmas adnate, radiating. *Capsule* short, opening by pores round the upper rim. *Seeds* small, pitted.

PAPAVER SOMNIFERUM, Linn.; F. B. I. i. 117; W. & A. 17.

An erect unbranched annual, with glabrous glaucous semi-amplexicaul leaves, ovate or linear-oblong and variously toothed; flowers white, red or purple; capsule globose, smooth, up to 1 in. thick.

Occasionally cultivated and found run wild. The Opium Poppy.

2. **Argemone**, Linn.

An erect, prickly annual with yellow juice. *Flowers* bright yellow. *Sepals* 2-3. *Petals* 4-6. *Stamens* very many. *Ovary* 1-celled; style very short; stigma 5-7-lobed; ovules many, on 4-7 parietal placentas. *Capsule* short, opening at the top by valves. *Seeds* many.

ARGEMONE MEXICANA, Linn.; F. B. I. i. 117; W. & A. 18.

A strong branched prickly annual, with sessile semi-amplexicaul sinuate-pinnatifid leaves variegated with white; flowers 1-3 in. across, yellow.

An introduced weed, found on roadsides, in waste places and fallow fields in all Districts.

Family IX. FUMARIACEAE.

Annual or perennial often, glaucous herbs with watery juice. *Leaves* usually decomposed. *Flowers* irregular, bisexual, racemed. *Sepals* 2, small, petaloid or scarious, deciduous. *Petals* 4, in 2 dissimilar pairs; 2 outer, both or only one gibbous at the base or spurred; inner smaller, often coherent at the tip. *Stamens* 6, usually in two bundles opposite the outer petals; central anther in each bundle 2-celled, others 1-celled. *Ovary* 1-celled; stigma on a distinct style, obtuse or lobed; ovules

parietal, 2 or more, amphitropous. *Fruit* an indehiscent 1-seeded nut, or a 2-valved many-seeded capsule. *Seeds* albuminous, with a minute embryo.

***Fumaria*, Linn.**

Annual branched sarmentose herbs. *Leaves* finely divided. *Flowers* small, white or pink, with purple tips to the petals, in terminal or leaf-opposed racemes. Outer anterior *petal* flat, posterior gibbous at the base. *Stamens* diadelphous, the posterior bundle with a spur inside the base of the posterior petal. *Ovary* 1-celled; style filiform; ovules 2 on 2 placentas. *Fruit* indehiscent, globose, 1-seeded.

FUMARIA PARVIFLORA, Lam.; W. & A. 18.

A diffuse pale green herb; leaf-segments very narrow; flowers 15-3 in. long; fruit slightly pointed even when ripe.

A weed of cultivation, chiefly at somewhat high elevations, as on the Mysore plateau and in the E. Nilgiris.

Family X. CRUCIFERÆ.

Herbs, rarely a little woody at the base, with watery sometimes pungent juice. *Leaves* alternate or radical, exstipulate. *Flowers* usually racemed rarely solitary, terminal or axillary. *Sepals* 4, 2 often larger and saccate at the base, imbricate. *Petals* 4, hypogynous, imbricate. *Stamens* 6, rarely fewer or many, 4 inner longer, in opposite pairs. *Disk* with 4 glands opposite the sepals. *Ovary* 2-celled, the division formed by a membrane connecting the placentas, or 1-celled, or with many superposed cells; style short or 0; stigma entire or 2-lobed. *Ovules* many, 2-seriate on the 2 parietal placentas, or rarely 1 or 2 erect. *Fruit* either 2-celled, the 2 valves deciduous and leaving the seeds on the persistent dissepiment or indehiscent or transversely jointed. *Seeds* small; albumen 0; cotyledons plano-convex or longitudinally bent or folded; radicle turned over the back of the cotyledon (*incumbent*) or along its side (*accumbent*).

Pods linear and dehiscent:—

Pods dehiscing and bearing seeds throughout their whole length; sepals not pouched; cotyledons accumbent:—

Pods cylindric seeds globose, 2-seriate or irregularly 1-seriate

1. ***Nasturtium*.**

Pods flattened; seeds compressed, 1-seriate; flowers white

2. Cardamine.

Pods 4-sided; seeds ovoid, 1-seriate; flowers yellow Barbarea.

Pods with a seedless indehiscent beak; sepals pouched at the base; cotyledons incumbent:—

Beak of pod cylindric or conical; seeds 1-seriate; flowers yellow

Brassica.

Beak flattened; seeds 2-seriate; flowers lilac, or yellow with lilac veins Eruca.

Pods flat, short and broad, dehiscent:—

Pods with a rounded top; style in a narrow cleft; seeds 2... Lepidium.

Pods triangular; style at the centre of the nearly flat top; seeds many in each cell 3. Capsella.

Pods of two globular indehiscent 1-seeded valves Senebiera.

1. Nasturtium, Br.

Terrestrial or aquatic branched glabrous or pubescent herbs. Leaves entire, lobed or pinnatifid. Flowers small, racemose, sometimes bracteate. Sepals spreading, not pouched at the base. Petals cuneate, hardly clawed, yellow or rarely white or 0. Stamens 2, 4 or 6. Pod long or short, nearly cylindric; valves faintly 1-nerved; septum thin, transparent. Seeds small, turgid, 2- or irregularly 1-seriate; cotyledons accumbent.

Flowers white; leaves all pinnate; plant glabrous, aquatic... 1. officinale.

Flowers yellow; upper and middle leaves obovate, coarsely bluntly toothed..... 2. indicum.

Flowers yellow; all leaves bipinnatifid, teeth sharp... 3. madagascariense.

1. NASTURTIIUM OFFICINALE, Br.; F. B. I. i. 133.

Nilgiri Hills, probably introduced. The Watercress.

2. NASTURTIIUM INDICUM, DC.; F. B. I. i. 134. N. madagascariense, W. & A. 19; Wt. Ill. t. 13 (not of DC.).

Wet places in hilly Districts, Mysore, Coorg, Nilgiris, Travancore.

3. NASTURTIIUM MADAGASCARIENSE, DC. Syst. ii. 192.

Hills of the N. Circars in Ganjam and Godavari, at low elevations.

2. Cardamine, Linn.

Herbs with entire lobed or pinnate leaves. Flowers white, pale purple or violet or very rarely yellow. Sepals not pouched. Petals

clawed. *Pods* narrow-linear, compressed, tapering at both ends; valves elastic, with a distinct midrib; stigma entire or 2-lobed. *Seeds* flattened, 1-seriate; cotyledons accumbent.

Lower leaves trifoliolate; pods 1.5 in. long.....1. *africana*.

Lower leaves 5- or more- foliolate; pods .5-1 in. long:—

Petals 0; leaflets sinuate 2. *trichocarpa*.

Petals 4; leaflets entire 3. *hirsuta*.

1. CARDAMINE AFRICANA, Linn.; F. B. I. i. 137; W. & A. 20; Wt. Ic. t. 941.

W. Gháts from the Nilgiris to the Travancore Hills at 4,000 to 7,500 ft.; Sivagiri Hills in Tinnevely; in woods.

2. CARDAMINE TRICHOCARPA, Hochst. *C. subumbellata*, Hook.; F. B. I. i. 138. *C. borbonica*, Pers.; W. & A. 20.

W. Gháts, in the Nilgiris and Pulneys, above 6,000 ft.; hills of Mysore; in woods.

3. CARDAMINE HIRSUTA, Linn.; F. B. I. i. 138; W. & A. 20.

W. Gháts, in the Nilgiris and Pulneys, a weed, probably introduced.

3. *Capsella*, Moench.

Small branched herbs. Radical *leaves* in a rosette, entire or pinnatifid. *Sepals* spreading, not pouched at the base. *Pods* obcordate ovate-oblong or cuneate, laterally compressed; valves boat-shaped; septum very narrow; style short. *Seeds* many, in 2 rows, narrowly margined; cotyledons incumbent.

CAPSELLA BURSA-PASTORIS, Moench; F. B. I. i. 159.

A small herb with pinnatifid root leaves and auricled stem ones; pods obcordate.

A weed of cultivation, especially at higher elevations. The Shepherd's Purse.

The following species occur as escapes from cultivation, as casual weeds, or in cultivation only:—

BARBAREA PRÆCOX, R. Br. "Winter Cress." Nilgiris.

BRASSICA CAMPESTRIS, Linn. Cultivated in various forms as the "Turnip," "Rape," "Kohl-Rabi," etc.

BRASSICA JUNCEA, Hook. f. & Thoms. Cultivated and found run wild, occasionally, as by Gough in the Kunbabs of the Nilgiris, in a locality to which it would hardly be considered introduced. The "Indian Mustard." Vern. *Hind. Rai*.

ERUCA SATIVA, Lam. "Rocket." Vern. *Hind.* Taranuri, Asan. Found only run wild in Madras, cultivated in N. India.

LEPIDIUM SATIVUM, Linn. "Garden Cress." Cultivated.

RAPHANUS SATIVUS, Linn. "Radish." Vern. *Hind.* Muli. Cultivated.

SENEBIERA DIDYMA, Pers. "Lesser Wart-cress." Nilgiris.

Family XI. CAPPARIDACEAE.

Herbs or shrubs, erect or climbing, rarely trees. *Leaves* alternate or very rarely opposite, simple or palmately 3-9-foliolate; leaflets usually entire; stipules spinescent or minute or 0. *Flowers* solitary, racemed, corymbose or umbelled, regular or rarely a little irregular, bisexual or rarely dioecious. *Sepals* generally 4, free or connate, usually imbricate. *Petals* 4, rarely 0, or very rarely 2, imbricate, hypogynous or sometimes inserted on the disk. *Stamens* usually 6, sometimes 4 or numerous, hypogynous or perigynous or inserted at the base of or on a long or short gynophore. *Disk* 0 or annular or lining the tube of the calyx. *Ovary* usually stalked, 1-celled; stigma usually capitate, sessile; ovules many, amphi- or campylo-tropous, on 2-4 parietal placentas. *Fruit* a pod-like capsule or a berry or rarely a drupe. *Seeds* angular or reniform, often imbedded in pulp; albumen 0, or thin; embryo variously folded and curved.

Herbs with usually digitate leaves and capsular fruit:—

Ovary long-stalked, with 6 stamens inserted on the gynophore; leaves 5-foliolate 1. **Gynandropsis.**

Ovary sessile, with 12 or more stamens inserted on the disk or, if the ovary is shortly stalked or stamens 6, then leaves 1-3-foliolate

2. **Cleome.**

Trees or shrubs with usually simple leaves and fruit usually a berry:—

Calyx tubular below:—

Petals 0; berry ovoid; leaves 3-5-foliolate; small trees

3. **Niebuhria.**

Petals 4; berry moniliform; leaves simple; climbers ...4. **Maerua.**

Calyx divided to the base into 4 sepals:—

Stamens inserted on the middle of the gynophore 5. **Cadaba.**

Stamens inserted on the base of the gynophore:—

Leaves simple; thorny or unarmed small trees or erect or climbing shrubs 6. **Capparis.**

Leaves trifoliolate; large unarmed trees 7. **Crataeva.**

1. Gynandropsis, DC.

Annual leafy herbs. *Leaves* long-petioled, digitately 3-7-foliate. *Flowers* white or purple, in bracteate racemes. *Petals* 4, spreading, long-clawed, open in bud. *Stamens* about 6, inserted upon the long gynophore, spreading. *Ovary* stalked, 1-celled, with 2 many-ovuled parietal placentas. *Capsule* and *seeds* as in CLEOME.

GYNANDROPSIS PENTAPHYLLA, DC.; F. B. I. i. 171; W. & A. 21.

A tall pubescent plant with pale purplish flowers 3-6 in. across in glutinous corymbs which elongate into dense bracteate racemes. Capsules 2-4 in. long, nearly glabrous, striate.

An annual weed, common in waste places in all Districts in the plains and at low elevations.

2. Cleome, Linn.

Herbs. *Leaves* simple or digitately 3-9-foliate. *Flowers* racemose or solitary and axillary, yellow rose or purple. *Sepals* 4, spreading. *Petals* 4, ascending, imbricate in the bud. *Stamens* 6-20, inserted on the disk. *Ovary* sessile or shortly stalked; style short or 0; ovules many on 2 parietal placentas. *Capsule* oblong or linear, valves 2, deciduous and leaving the seeds attached to the placentas. *Seeds* reniform.

Whole plant viscous with stalked glands; ovary densely glandular, sessile; capsule thinly glandular; leaves 3-5-foliate; flowers yellow

1. *viscosa*.

Plants glabrous, pubescent or asperous but not viscous; ovary and capsule glabrous:—

Leaves simple, linear oblong; stamens 6; flowers dull purple or pink

2. *monophylla*.

Leaves 3-9-foliate:—

Leaflets filiform; capsule sessile; stamens 6; flowers yellow; plant glabrous 3. *tenella*.

Leaflets linear-oblong to obovate:—

Leaves 3-foliate:—

Stem and leaves glabrous, not asperous; stamens 6; flowers purple 4. *Burmanni*.

Stem and leaves asperous; capsule glabrous:—

Stem and leaves entirely clothed with stiff appressed scale-like hairs; capsule 8 times as long as broad; stamens about 30; flowers pink 5. *felina*.

Stem and leaves asperous with minute scattered prickles;
 stamens 6; flowers pink 6. *aspera*.
 Leaves 5-9-foliolate; capsule 40 times as long as broad; stamens
 numerous; flowers rose 7. *Chelidonii*.

1. CLEOME VISCOSA, Linn.; F. B. I. i. 170. *Polanisia icosandra*,
 W. & A. 22; Wt. Ic. t. 2.

A common weed, in fields and waste places, in all Districts.

2. CLEOME MONOPHYLLA, Linn.; F. B. I. i. 168; W. & A. 21.

A weed of fields and waste places, in all Districts.

3. CLEOME TENELLA, Linn. f.; F. B. I. i. 169; W. & A. 21.

Dry, usually sandy, places in the Carnatic Districts from
 Nellore to Tinnevely and S. Travancore.

4. CLEOME BURMANI, W. & A. 22; F. B. I. i. 170.

Fields and dry places in the Carnatic Districts.

5. CLEOME FELINA, Linn. f.; F. B. I. i. 170; W. & A. 22.

Deccan and Carnatic Districts, in dry places, often on
 black cotton soil.

6. CLEOME ASPERA, Koenig; F. B. I. i. 169; W. & A. 22; Wt.
 Ic. t. 287.

Sandy fields and waste places in the N. Circars, Deccan
 and Carnatic, up to 2,000 ft. in the hills.

7. CLEOME CHELIDONII, Linn. f.; F. B. I. i. 170. *Polanisia*
Chelidonii, DC.; W. & A. 22; Wt. Ic. t. 319.

Moist places as on the borders of rice-fields, in the N.
 Circars and Deccan Districts.

3. Niebuhria, DC.

Small trees, unarmed. Leaves 3-5-foliolate; stipules setaceous.
 Racemes few-flowered, terminal or axillary. Calyx-tube ovoid;
 limb 4-cleft, lobes valvate. Petals 0. Stamens numerous, spread-
 ing from the gynophore at about the level of the top of the
 calyx-tube. Ovary stipitate, 1-celled; ovules many on 2 parietal
 placentas; stigma subsessile. Berry ovoid, 1-seeded, on a long
 gynophore. Seed large with fleshy involute cotyledons.

- NIEBUHRIA APETALA, Dunn. *N. linearis*, DC.; F. B. I. i. 171;
 W. & A. 23; Wt. Ic. t. 174. *Capparis apetala*, Roth.

A small unarmed tree with axillary and terminal racemes of
 small dark greenish-purple flowers. Gynophore more than
 1 in. long.

Dry forest tracts in Kistna, Kurnool and Cuddapah, also in Tinnevely.

The wood is divided by bark tissue into concentric sometimes anastomosing layers. Vern. *Tam. Iruvalli*.

4. *Maerua*, Forsk.

Climbing shrubs. *Leaves* simple. *Flowers* corymbose. *Calyx-tube* lined by the disk, with 4 valvate lobes. *Petals* 4, inserted on the edge of the disk, ovate, smaller than the calyx-lobes. *Stamens* many, inserted high up on the gynophore. *Ovary* long-stalked, 1-celled or becoming 2-celled by the cohesion of the placentas; ovules many, on 2-4 parietal placentas. *Berry* fleshy, elongate, moniliform, 1- or more-seeded. *Cotyledons* fleshy, involute.

MAERUA ARENARIA, Hook. f. & Thoms.; F. B. I. i. 171. *Niebuhr* *oblongifolia*, DC.; W. & A. 23.

A large woody climber with terminal corymbs of greenish-yellow flowers. Leaves simple and entire, varying from broadly ovate to oblong and from acute to retuse.

Deccan and Carnatic Districts from Godavari southwards.

The wood is in concentric layers as in *Niebuhr*.

5. *Cadaba*, Forsk.

Rigid wiry unarmed shrubs. *Leaves* simple or 3-foliolate. *Flowers* solitary, corymbose or racemed. *Sepals* 4, unequal, in 2 whorls, outer 2 valvate. *Petals* 4 or 2, clawed, hypogynous. *Disk* large, coloured, encircling the gynophore with its tubular stalk and expanded trumpet-wise at the top or spathulate. *Stamens* 4-6, inserted unilaterally on the slender gynophore. *Ovary* 1-celled; stigma sessile; ovules many, on 2-4 parietal placentas. *Fruit* a fleshy slender cylindric berry or sometimes dehiscent ultimately by two valves which fall away from the placentas. *Seeds* globose; testa horny; cotyledons convolute.

Leaves trifoliolate; petals 2, pure white with yellowish veins; disk limb bright yellow; stamens 6; fruit 2-4 in. long, dehiscent.....1. *trifoliata*.

Leaves simple; petals 4, greenish white; stamens 4; fruit 1-1.5 in. long, eventually dehiscent 2. *indica*.

1. CADABA TRIFOLIATA, W. & A. 24; F. B. I. i. 172.

E. Ghát forests of Nellore, Cuddapah and Kurnool; also in Coimbatore, S. Arcot and Tinnevely.

A large shrub, the wood in concentric layers as in *Niebuhria*.

2. *CADABA INDICA*, Lam. ; F. B. I. i. 172; W. & A. 24.

Dry Districts of the N. Circars, Deccan and Carnatic from Vizagapatam southwards; often on old walls, on trees, in waste places, and about villages.

A straggling or half-climbing shrub; wood not in concentric layers.

6. *Capparis*, Linn.

Trees or shrubs, erect straggling or climbing, unarmed or with stipular thorns. *Leaves* simple or 0. *Flowers* white or coloured, often showy. *Sepals* 4, free, in 2 whorls, all imbricate or the outer valvate. *Petals* 4, sessile, imbricate, 2 rarely united into a short spur at the base. *Stamens* long, numerous, inserted on the torus at the base of the gynophore. *Ovary* stalked, 1-4-celled; ovules many, on 2-6 parietal placentas. *Fruit* fleshy, rarely dehiscent by valves. *Seeds* numerous, imbedded in pulp; testa crustaceous or coriaceous; cotyledons convolute.

Mature branches leafless; thorns straight; flowers under 1 in. across, red; fruit globose, red 1. *aphylla*.

Mature branches leafy:—

Flowers solitary or nearly so:—

Ovary glabrous, grooved; flowers 2.5-3 in. across:—

Thorns hooked; leaves pubescent beneath; flowers white; fruit slightly granular, oblong.....2. *grandiflora*.

Thorns straight; leaves glabrous; flowers red; fruit rugose, globular.....3. *stylosa*.

Ovary tomentose; flowers white tinged with yellow:—

Flowers 1.5-2 in. across:—

Pedicel not less than $\frac{1}{2}$ the gynophore:—

Berry ovoid; leaves 1.5-2.5 in. long 4. *brevispina*.

Berry fusiform, narrowed into the gynophore; leaves 3-5 in. long 5. *fusifera*.

Pedicel 5 times shorter than the gynophore; berry .7 in. across, black 6. *olacifolia*.

Flowers 4-5 in. across; thorns minute or 0.....7. *Heyneana*.

Flowers in racemes, umbels, corymbs or panicles:—

Umbels or corymbs solitary:—

Pedicels stout, umbelled, 1-3-flowered, sessile at the ends of leafy twigs; fruit oblong 8. *diversifolia*.

Pedicels approximate but not umbelled, often at the ends of leafless twigs, forming stout corymbs, or, if forming slender umbels, then thorns small or 0, and buds and pedicels finely tomentose:—

Leaves glabrous, oblong:—

Flowers 4-5 in. across; thorns short, stout, hooked; young branches glabrous 9. *Moonii*.

Flowers 1-5 in. across; thorns few or 0; young branches hoary:—

Flower-buds glabrous; leaf nerves ascending 10. *Roxburghii*.

Flower-buds tomentose; leaf nerves divaricate 11. *Cleghornii*.

Leaves usually velvety on both sides, never quite glabrous, lanceolate to oblate; flowers 1 in. across; fruit globose, dotted, 1-5 in. across 12. *grandis*.

Pedicels slender, usually numerous, in terminal or axillary sessile or shortly-stalked umbels:—

Spines 0, or very few and small; buds and pedicels glabrous:—

Twigs densely shortly pubescent; fully grown buds 2 in. long 13. *tomentella*.

Twigs glabrous; fully grown buds 1 in. long; fruit pisiform 14. *parviflora*.

Spines numerous, recurved:—

Leaves round; gynophore in flower 1 in. long; umbel few-flowered 15. *pedunculosa*.

Leaves ovate-lanceolate; gynophore in flower 2 in. long; umbel many-flowered; flower small, white; fruit 5 in. across 16. *sepiaria*.

Umbels paniced; flowers small, white; prickles recurved or 0; fruit 7 in. across, green 17. *floribunda*.

Flowers in supra-axillary rows:—

Stout climbing shrub; young parts tomentose; fully grown buds 3 in. in diam.; fruit 1-5 in. in diam., reddish brown; flowers white, turning rose 18. *zeylanica*.

Slender shrub; young parts glabrous; fully grown buds 15-2 in. in diam.; flowers white; fruit pisiform 19. *tenera*.

1. *CAPPARIS APHYLLA*, Roth; F. B. I. i. 174; W. & A. 27; Brand. For. Fl. t. 3.

Tinnevely.

A twiggy shrub or small tree; wood light yellow, hard and close-grained.

2. CAPPARIS GRANDIFLORA, Wall.; F. B. I. i. 174; *C. pyrifolia*, W. & A. 25; Wt. Ic. t. 1047 (not of Lam.).
E. slopes of Nilgiris, up to 4,000 ft., also adjacent parts of Mysore and Coimbatore.
A form with straight thorns and glabrose twigs was collected at Madras by Bulkley in 1703, also by Heyne in Mysore in 1800, but the specimens are imperfect.
3. CAPPARIS STYLOSA, DC.; W. & A. 25. *C. divaricata*, Hook. f. & Thoms.; F. B. I. i. 174; Wt. Ic. t. 889 (not of Lam.).
Dry forests of the Deccan and Carnatic from Kurnool to Tanjore, up to 1,500 ft., on stony land and on black cotton soil.
A small tree with rough bark and white hard wood. Vern. Tel. Badreni; Tam. Toaratti; Mar. Pachúnda.
4. CAPPARIS BREVISPIA, DC.; W. & A. 24. *C. zeylanica*, Wall.; F. B. I. i. 74 (not of Linn.).
Dry forest tracts of N. Circars, Nellore, Salem and Tinnevely, usually near the coast.
A handsome shrub with conspicuous flowers.
5. CAPPARIS FUSIFERA, Dunn in Kew Bull. 1914, 377.
Tinnevely District, at Udumanparai (Bader).
6. CAPPARIS OLACIFOLIA, Hook. f. & Thoms.; F. B. I. i. 178.
Slopes of Mahendragiri Hill in Ganjam at 4,500 ft.
A thorny shrub.
7. CAPPARIS HEYNEANA, Wall.; F. B. I. i. 74; W. & A. 25.
W. Gháts in Tinnevely District.
A nearly unarmed shrub.
8. CAPPARIS DIVERSIFOLIA, W. & A. 27; F. B. I. i. 175.
E. slopes of W. Gháts in Coimbatore and Tinnevely.
A shrub with zigzag branches and recurved thorns.
9. CAPPARIS MOONII, Wt. Ill. 35; F. B. I. i. 175.
W. Gháts from Coimbatore to Travancore and Tinnevely, up to 2,000 ft.
A large woody climber.
10. CAPPARIS ROXBURGHII, DC.; F. B. I. i. 175; W. & A. 26; Wt. Ic. t. 1048.
Forests of the W. Gháts in Coimbatore; Chingleput in Carnatic.
A large woody climber.

11. CAPPARIS CLEGHORNII, Dunn. *C. Roxburghii*, Cooke Fl. Bomb. i. 46 (not DC.).
Forests of the W. Gháts in S. Canara and Mysore.
A large woody climber.
12. CAPPARIS GRANDIS, Linn. f.; F. B. I. i. 176; W. & A. 27.
C. bisperma, Roxb.; W. & A. 26.
Hill forests of the Deccan, Carnatic and E. slopes of the W. Gháts from the Godavari through Kurnool and Bellary southwards.
A small tree with white durable wood. Vern. Tel. Guli, Ragota, Nallupi; Tam. Mudkondai; Kan. Torate.
13. CAPPARIS TOMENTELLA, Dunn. *C. parviflora*, Bedd. Ic. t. 276 (not of Hook. f. & Thoms.).
Forests of Travancore.
A large spreading much-branched shrub.
14. CAPPARIS PARVIFLORA, Hook. f. & Thoms.; F. B. I. i. 176.
Sivagiri Hills in Tinnevely on E. slopes of W. Gháts.
A spreading much-branched shrub.
15. CAPPARIS ROTUNDIFOLIA, Rottl. *C. pedunculosa*, Wall.; F. B. I. i. 176; W. & A. 27; Bedd. Ic. t. 277.
Striharikota forest in Nellore; Point Calimere in Tanjore, a coast plant.
A spreading shrub with small round leaves.
16. CAPPARIS SEPIARIA, Linn.; F. B. I. i. 177; W. & A. 26.
incanescens, DC.; W. & A. 26. /g; /ross
N. Circars, Hyderabad, Deccan and Carnatic in dry forest.
and in hedges and scrub.
A large straggling shrub with wiry branches, very thorny.
17. CAPPARIS FLORIBUNDA, Wt. Fl. t. 14; F. B. I. i. 177.
N. Circars; Malabar.
A large woody climbing shrub.
18. CAPPARIS ZEYLANICA, Linn. *C. horrida*, Linn. f.; F. B. I. i. 178; W. & A. 26; Wt. Ic. t. 173.
Dry forests in all Districts of the N. Circars, Deccan and Carnatic, very common.
A large, climbing, very thorny shrub. Vern. Ur. Oserwa; Tel. Atonda; Mar. Wag, Gowindi; Tam. Atanday.
19. CAPPARIS TENERA, Dalz.; F. B. I. i. 179.
W. Gháts in Malabar.
A climbing shrub with hooked thorns.

7. *Crataeva*, Linn.

Small or medium-sized spreading trees. *Leaves* digitately trifoliate. *Flowers* large, polygamous. *Sepals* 4, adnate to the lobed disk. *Petals* 4, long-clawed, open in bud. *Stamens* very numerous, inserted at the base of the gynophore. *Ovary* on a slender gynophore, 1-(2-)celled; stigma sessile; ovules many, on 2 parietal placentas. *Berry* fleshy with a hard rough rind; sometimes divided by a longitudinal septum. *Seeds* imbedded in the pulp.

CRATAEVA RELIGIOSA, Forst.; F. B. I. i. 172, Bedd. Fl. t. 116. *C. Roxburghii*, Br.; W. & A. 23. *C. Nurvala*, Ham.; W. & A. 23.

A small or medium-sized tree with broad terminal corymbs of white flowers, which turn yellow soon after opening; filaments purple. Berry 1-2 in. thick, globose or ovate.

Found here and there occasionally in almost all Districts, often planted, frequent along river banks.

Wood yellowish white, even-grained but not durable. Vern. *Tam.* Marvilinga; *Tel.* Uskiaman, Voolemara; *Kan.* Nirvāla; *Mal.* Nir mathalam.

Family XII. RESEDACEAE.

RESEDA LUTOLA, L., has occurred as a casual weed about Ootacamund in the Nilgiris.

Family XHI. VIOLACEAE.

Herbs, shrubs or trees. *Leaves* alternate or very rarely opposite, entire crenate serrate or pinnatisect, stipulate. *Flowers* regular or irregular. *Sepals* 5, equal or unequal, imbricate or contorted in bud. *Stamens* 5, free or monadelphous; anthers erect, connective produced beyond the cells. *Ovary* sessile, 1-celled; style simple; stigma terminal or lateral, capitate, truncate or cupular, entire or lobed; ovules many, on 3 parietal placentas, anatropous. *Fruit* a 3-valved capsule, rarely a berry. *Seeds* small; albumen fleshy; embryo axile; cotyledons flat.

Herbs, sometimes a little woody at the base; flowers irregular;—
Petals about equal in height; *sepals* produced below their insertion; *peduncles* more than 1 in. long 1. *Viola*,

Petals unequal, lower larger, oval or orbicular, on a long claw; sepals not produced below; peduncles less than 5 in. long 2. *Ionidium*.
 Shrubs or trees with regular flowers 3. *Alsodeia*.

1. *Viola*.

Herbs, rarely woody below. *Flowers* 1-2 on long axillary peduncles, sometimes large-petalled but ripening few seeds, sometimes small-petalled ripening many seeds, normal and cleistogamous. *Sepals* produced at the base. *Petals* erect or spreading, lower largest, spurred at the base. *Anthers* connate, connectives of the lower 2 often produced into spurs within the spur of the corolla. *Style* clavate or truncate, tip straight or bent; stigma obtuse, lobed or cup-shaped. *Capsule* 3-valved. *Seeds* ovoid or globose.

Leaves triangular-lanceolate, not deeply cordate; petiole winged; plant stemless 1. *Patrinii*.

Leaves ovate, deeply cordate; petiole not winged; flowers on leafy stems:—

Sepals linear, gradually attenuate from a lanceolate base; stigma usually lateral.....2. *serpens*.

Sepals ovate-lanceolate, obtuse; stigma terminal.....3. *distans*.

1. *VIOLA PATRINII*, DC.; F. B. I. i. 183; W. & A. 32. *V. Walkeri*, Wt. Ill. i. 42, t. 18.

Hills of the N. Circars in Ganjam at 4,000 ft.; W. Gháts in Mysore, the Nilgiris, Anamalais and Pulneys at over 4,000 ft.; Shevaroy Hills in Salem.

2. *VIOLA SERPENS*, Wall.; W. & A. 32; F. B. I. i. 184. *V. Wightiana*, Wt. Ic. t. 943.

Hills of Ganjam; W. Gháts from the Nilgiris to Travancore at over 6,000 ft.

3. *VIOLA DISTANS*, Wall.; F. B. I. i. 183.

W. Gháts, in Mysore the Nilgiris and Pulneys at over 6,000 ft.

2. *Ionidium*, Vent.

Herbs or small shrubs. *Leaves* alternate, rarely opposite. *Flowers* solitary, axillary, red. *Sepals* 5, subequal, not produced below their insertion. *Petals* 5, the lower one on a long claw, saccate or spurred at the base. *Anthers* connate or free, 2 or 4 of

them gibbous or spurred at the back. *Ovary* ovoid; style clavate, incurved; stigma oblique. *Capsule* 3-valved, subglobose, few-seeded. *Seeds* globose; testa crustaceous.

Seeds conspicuously finely striate; valves of capsule about 2 in. long; undershrub, with red flowers 1. *suffruticosum*.

Seeds obscurely striate; capsule valves about 4 in. long; large shrub, with pink flowers 2. *travancoricum*.

1. *IONIDIUM SUFFRUTICOSUM*, Ging. ; F. B. I. i. 185; W. & A. 32; Wt. Ill. t. 19; Wt. Ic. t. 308. *I. enneaspermum*, DC.; W. & A. 33. *I. leptorhizum*, DC.; W. & A. 32.

Grassy places, in fields, roadsides, and open forest lands in almost all Districts.

2. *IONIDIUM TRAVANCORICUM*, Bedd. Ic. t. 230.

Hills of Tinnevely and Travancore at 2,000 to 3,000 ft.

3. *Alsodeia*.

Trees or shrubs. *Leaves* alternate or rarely opposite; transverse nervules numerous, distinct and parallel; stipules rigid. *Flowers* small, axillary or terminal, solitary fascicled cymose or racemose, regular; peduncles with many bracts. *Sepals* 5, rigid. *Petals* 5, sessile. *Stamens* 5, on or within the annular disk; connective produced into a membranous appendage. *Ovary* ovoid; style straight; stigma terminal; ovules few or many. *Capsule* 3-valved, few-seeded. *Seeds* glabrous.

ALSODEIA ZEYLANICA, Thwaites; F. B. I. i. 187.

A large shrub or small tree with ovate-lanceolate slightly crenate or serrate leaves and fascicles of small white flowers on short axillary spurs.

Forests of Malabar and Travancore up to 2,500 ft.

Family XIV. BIXACEAE.

Trees or shrubs. *Leaves* alternate; stipules small or 0. *Inflorescence* various. *Flowers* regular, 1-2-sexual. *Sepals* 3-8, usually imbricate and free or connate and bursting irregularly, usually deciduous. *Petals* 4-5 or 0, imbricate or contorted in bud, deciduous. *Stamens* indefinite, usually hypogynous; anthers dehiscent by slits or pores. *Disk* thickened, often glandular. *Ovary* 1-, or, by the intrusion of walls, multi-cellular; style and

stigmas free or united. *Ovules* on 2 or many parietal placentas, amphitropous or anatropous. *Fruit* dry or fleshy, indehiscent or dehiscent with as many valves as placentas. *Seeds* arillate or testa pulpy; albumen fleshy; embryo axile; cotyledons foliaceous, often cordate.

Leaves palmately lobed; flowers 4-5 in. across; fruit a capsule

1. **Cochlospermum.**

Leaves not lobed:—

Leaves large, ovate-cordate; petals white or pink, 1 in. long; fruit a bristly capsule; seeds covered by a red testa 2. **Bixa.**

Leaves large, more or less oblong; petals white or yellowish, 5 in. long with scales attached within; fruit large, woody, tomentose:—

Stamens 5-8; peduncles 1-few-flowered, axillary; leaves serrate or with reticulate nervules 3. **Hydnocarpus.**

Stamens indefinite; peduncles often fascicled on the old wood; leaves entire with parallel nervules 4. **Asteriastigma.**

Leaves rather small; petals 0, or under 1 in. long; fruit a small glabrous berry; usually thorny:—

Style long, erect, entire or lobed; all the flowers bisexual

5. **Scolopia.**

Style very short, entire or branched; most flowers unisexual:—

Stigma entire or slightly lobed at the end of the simple style; ovary 1-celled; berry globose, passing abruptly into the style, under 3 in. in diam. 6. **Xylosma.**

Stigmas separate at the top of the style or of its branches or, if capitate, then berry ovate, acuminate, over 5 in. in diam.

7. **Flacourtia.**

1. **Cochlospermum, Kunth.**

Trees or shrubs with yellow or red juice. *Leaves* palmately lobed. *Flowers* bisexual. *Sepals* 5, deciduous. *Petals* 5, large, contorted in bud. *Stamens* many, inserted on an eglandular disk; anthers opening by a short slit at the top. *Ovary* nearly 3-5-celled; ovules numerous, on 3-5 parietal placentas; style 1, filiform. *Capsule* 3-5-valved. *Seeds* numerous, cochleate; testa with long woolly hairs; albumen oily; embryo curved.

COCHLOSpermum GOSSYPiUM, DC.; F. B. I. i. 196; W. & A. 87; Bedd. Fl. t. 171.

A deciduous tree with 5-lobed leaves tomentose beneath, and large golden-yellow flowers with silky sepals. Fruit a

large brown pear-shaped striate leathery capsule, containing numerous seeds surrounded by pale brown cottony hairs. Dry forests, especially on stony hills, in all Districts, but less common on the W. Coast, conspicuous when in flower in the hot season before the leaves appear.

Wood fibrous, quite valueless; cotton of the seeds but little used. Vern. *Hind.* Galgal; *Ur.* Kontopalas; *Tel.* Kandugogu; *Tam.* Tanaku, Kongillam; *Mal.* Appa kudakka; *Kan.* Baruga.

2. *Bixa*, Linn.

A shrub or small tree. *Leaves* simple; stipules minute. *Flowers* in terminal panicles, bisexual. *Sepals* 5, imbricate, deciduous. *Petals* 5, contorted in bud. *Anthers* opening by 2 terminal pores. *Ovary* 1-celled; style slender, curved; ovules numerous, on 2 parietal placentas. *Capsule* loculicidally 2-valved. *Seeds* many, testa red and pulpy; albumen fleshy; embryo large; cotyledons flat.

BIXA ORELLANA, Linn.; F. B. I. i. 190; W. & A. 31; Wt. Ill. i. 17; Bedd. Fl. t. 79.

A small evergreen tree with large cordate-acuminate leaves. Flowers large, white or purplish, few together in terminal panicles. Capsules reddish brown, softly bristly.

Cultivated and found run wild especially in Western Districts. The Arnotto. Vern. *Hind.* Latkan; *Tel.* Jafra.

3. *Hydnocarpus*, Gaertn.

Shrubs or trees. *Leaves* alternate, entire or serrate; transverse nervules and reticulation conspicuous. *Flowers* solitary, fascicled, racemose or cymose, dioecious. *Sepals* 5, imbricate. *Petals* 5, provided at the base inside with a scale often as long as themselves. ♂ *Stamens* 5-15; anthers reniform or ovate-cordate with a broad connective. *Ovary* rudimentary or 0. ♀ *Stamens* similar but without pollen, or rudimentary. *Ovary* 1-celled; stigmas 3-6, sessile or nearly so, spreading, dilated, lobed; ovules many, on 3-6 parietal placentas. *Berry* globose, many-seeded; rind hard. *Seeds* 1, 2 or few, imbedded in pulp; testa bony; albumen oily; cotyledons broad, flat.

Leaves more or less serrate, nervules parallel; petals glabrous, greenish white; scale as long as petals, linear, ciliate 1. *Wightiana*.

Leaves entire, nervules reticulate; petals ciliate, greenish; scale $\frac{1}{2}$ as long as petals, ovate, woolly 2. *alpina*.

1. *HYDNOCARPUS WIGHTIANA*, Bl.; F. B. I. i. 196. *H. inebrians*, Vahl; Wt. Ill. i. t. 16.

Forests of the W. Coast and W. Gháts from S. Canara southwards, up to 2,000 ft., often near water.

A large evergreen tree: wood greyish white, of no value. Vern. *Mar.* Kastel; *Tam.* Maravetti; *Kan.* Toratti; *Mal.* Kodi, Nirvetti.

2. *HYDNOCARPUS ALPINA*, Wt. Ic. t. 942; F. B. I. i. 197; Bedd. Fl. t. 77.

W. Gháts in hill forests from S. Canara to Travancore, at up to 6,000 ft.

A large evergreen tree; wood greyish brown, of no great value. Vern. *Tam.* Attuchankalai.

4. *Asteriastigma*, Bedd.

Large trees with alternate entire leaves. *Flowers* large, polygamous, in axillary fascicles or on the old wood. *Sepals* 4, imbricate. *Petals* 12-16, shorter than the sepals, ciliate, furnished with 3-lobed scales at the base inside. *Stamens* very numerous, many-seriate. *Ovary* with many ovules on 6-7 parietal placentas, and as many large sessile 2-lobed stigmas. *Fruit* woody, globose, with numerous angular seeds.

ASTERIASTIGMA MACROCARPA, Bedd. Fl. t. 266; Bedd. Ic. t. 242.

A handsome evergreen tree. Flowers 1 in. across, white, with a sickly scent. Fruit dark brown, 5-6 in. in diam.

Forests of Travancore at 1,500 to 3,000 ft.

5. *Scolopia*, Schreber.

Spinous trees; spines often branched. *Leaves* alternate, with 3 or 5 pairs of nerves spreading from the base; stipules minute or 0. *Flowers* small, 2-sexual, in axillary racemes or narrow panicles. *Sepals* and *petals* 4-6 each, imbricate in bud. *Stamens* many; anthers ovoid, opening by slits, connective produced above. *Ovary* 1-celled; style erect; stigma entire or lobed; ovules few, on 3-4 parietal placentas. *Berry* 2-6-seeded.

SCOLOPIA CRENATA, Clos.; F. B. I. i. 191; Bedd. Fl. t. 78.

Phoberos crenatus, *lanceolatus* and *Wightianus*, W. & A. 29-30.

A medium-sized tree, very variable in armature and leaves. Stamens spreading over a circle 3-4 in. across, much exceeding the small white petals, shorter than the long straight style. Berry green, globose, 7 in. in diam.

Forests of the W. Ghâts in all hill Districts above 2,000 ft.; higher hills of Cuddapah, Chingleput and Salem.

Wood reddish brown, said to be very hard. Vern. Tam. Charalu.

6. *Xylosma*, Forster.

Characters of FLACOURTIA, but with rarely more than 2 placentas in each 1-celled ovary, and with the style usually entire, short, and ending in a few sessile stigmas. Berry globose, 3-8-seeded.

Leaves linear-lanceolate or linear-oblong, acuminate 1. *longifolium*.

Leaves ovate, obtuse or acute 2. *latifolium*.

1. XYLOSMA LONGIFOLIUM, Clos.; F. B. I. i. 194; Brand. For. Fl. t. 4.

Forests of the E. Ghâts in Ganjam and Vizagapatam at 2,000 to 4,500 ft.

A small tree, unarmed or with few very long straight spines.

2. XYLOSMA LATIFOLIUM, Hook f. and Thoms.; F. B. I. i. 194.

Forests of the Bababuden Hills in Mysore.

A large thorny tree.

7. *Flacourtia*, Commers.

Trees or shrubs, often thorny. Leaves toothed or crenate, 3-5-nerved at the base. Flowers small, dioecious, rarely 2-sexual. Sepals 4-5, imbricate. Petals 0. Stamens many; anthers versatile. Ovary on an annulate or lobed disk, or disk represented by separate glands; styles 2-10, separate, connate or 0; stigmas notched, 2-lobed or, in the absence of styles, capitate; ovules usually in pairs on each placenta. Fruit indehiscent; endocarp hard with as many cells as seeds, or separating into 1-seeded stones; cotyledons orbicular.

A shrub. Leaves 1-2 in. long, obovate; flowers usually on the thorns; pedicels nearly or quite glabrous 1. *sepiaria*.

A shrub or small tree. Leaves 2-4 in. long, ovate, usually glabrous; flowers not on the thorns:—

Racemes glabrous; fruits ovoid, 6-7 in. long 2. *Cataphracta*.

Racemes pubescent or tomentose; fruits purple, the size of peas

3. *Ramontchi*.

A thorny tree. Leaves 5-7 in. long, pubescent beneath; fruits resembling cherries 4. *montana*.

1. *FLACOURTIA SEPIARIA*, Roxb. Cor. Pl. i. 48, t. 68; F. B. I. i. 194; W. & A. 29.

Scrub forests in all Districts, especially on the Coromandel coast and in the Deccan.

2. *FLACOURTIA CATAPHRACTA*, Roxb.; F. B. I. i. 193.

E. Gháts of Vizagapatam District (Lushington).

A small tree, only once reported, but it occurs in Orissa, so may well be occasional in the N. Circars.

3. *FLACOURTIA RAMONTCHI*, L'Hérit.; F. B. I. i. 193; W. & A. 29; Wt. Ic. t. 85. *F. sapida*, Roxb. Cor. Pl. i. t. 69; W. & A. 29.

Forests of the N. Circars and Deccan, up to 3,000 ft.; occasional on the W. Coast.

A shrub with small leaves in the scrub forests and on rocky hills, a small tree with rather large leaves in the larger forests. Vern. *Ur.* Balibaincho; *Tel.* Kanregu; *Tam.* Katukali.

4. *FLACOURTIA MONTANA*, Grah.; F. B. I. i. 192.

Forests of the W. Coast and W. Gháts, not common, up to 3,000 ft.

Family XV. PITTOSPORACEAE.

Trees, erect or climbing shrubs or undershrubs. Leaves alternate, fascicled, very rarely opposite or verticillate, quite entire or very rarely toothed. Flowers hermaphrodite, in various terminal and axillary inflorescences. Sepals 5, free or connate, imbricate. Petals 5, hypogynous, free or connate, imbricate. Torus small. Stamens 5, free; anthers versatile. Ovary 1-celled, or 2-5-celled by the intrusion of as many parietal placentas; style simple; stigma terminal, 2-5-lobed; ovules many, parietal or axile, anatropous. Fruit capsular or indehiscent. Seeds usually

numerous; albumen copious; embryo minute, radicle next the hilum.

Pittosporum, Banks.

Trees or erect shrubs, usually green. *Sepals* free or connate below. *Petals* erect, recurved at the top, claws connivent or connate. *Stamens* 5, erect; anthers 2-celled, bursting inwards by slits. *Ovary* sessile or shortly stalked, incompletely 2-3-celled; ovules 2 or more on each placenta. *Capsule* 1-celled, woody, 2- or 3-valved; placentas in the middle of the valves. *Seeds* 2-9, covered with oily resinous pulp.

Flowers in paniculate often contracted racemes; fruit 2 in. in diam.; seeds 6; twigs glabrous.....1. *floribundum*.
Flowers in slender simple racemes; fruit 35-4 in. in diam.; seeds 5-9; twigs glabrous 2. *nilghirens*.
Flowers in stout sessile or subsessile umbels; fruit 4 in. in diam.; seeds 3-4; twigs glabrous or pubescent.....3. *tetraspermum*.
Flowers in umbellate racemes; fruit 4 in. in diam.; seeds 6; ovary inflorescence and twigs densely tomentose 4. *dasycaulon*.

1. *PITTOSPORUM FLORIBUNDUM*, W. & A. 154; F. B. I. i. 199.
Mahendragiri Hill in Ganjam at 4,500 ft.; Hills of S. Arcot and Salem; W. Gháts from Mysore southwards, at 4,000 ft. and higher.
2. *PITTOSPORUM NILGHIRENSE*, W. & A. 154; F. B. I. i. 198; Wt. Ill. i. t. 70.
W. Gháts, in Shola forests above 3,000 ft., from Mysore to Travancore.
3. *PITTOSPORUM TETRASPERMUM*, W. & A. 154; Wt. Ic. t. 971; F. B. I. i. 198.
W. Gháts, in Shola forests above 5,000 ft. from Nilgiris to Travancore; Hills of Coimbatore.
4. *PITTOSPORUM DASYCAULON*, Miq.; F. B. I. i. 199.
W. Gháts, in Shola forests above 3,000 ft., from Mysore to Travancore.

Family XVI. POLYGALACEAE.

Annual or perennial herbs, erect or climbing shrubs, or large trees. *Leaves* usually alternate, simple, entire or occasionally

reduced to scales or 0. *Stipules* 0. *Flowers* irregular, 2-sexual, bracteate racemose capitate panicled or spicate. *Sepals* 5, unequal, the 2 inner (*wing-sepals*) larger, petaloid, deciduous or persistent, imbricate in bud. *Petals* 3 or 5, unequal, free from each other but usually adherent to the staminal sheath, the lower one usually boat-shaped. *Stamens* usually 8, monadelphous or rarely distinct; anthers 1- or 2-celled opening by transverse valves or terminal pores. *Ovary* free, 1-3-celled; style simple, generally curved, filiform or variously dilated above; stigma capitate; ovules 1 or more in each cell, anatropous. *Fruit* generally a 2-celled 2-seeded loculicidal capsule, or indehiscent and 1-seeded or of 3 indehiscent samaroid carpels. *Seeds* pendulous, usually carunculate; testa often hairy; embryo axile, with or without fleshy albumen.

Herbs or shrubs; capsule loculicidal, 2-celled, 2-seeded; flowers irregular:—

Annual herbs. Flowers minute, in long terminal spikes; stamens 4-5; sepals nearly equal 1. **Salomonina**.

Herbs or shrubs. Flowers fairly large, stalked; stamens 8; 2 sepals larger (wing-sepals) 2. **Polygala**.

Large trees; fruit indehiscent; 1-seeded; flowers nearly regular

3. **Xanthophyllum**.

1. **Salomonina**, Lour.

Small branched or simple annuals. *Flowers* minute, in dense terminal spikes. *Sepals* nearly equal. *Petals* 3, united at the base with the staminal tube, the inferior one keel-shaped, hooded, not crested. *Stamens* 4-5, filaments united into a sheath below; anthers opening by pores. *Ovary* 2-celled; 1 pendulous ovule in each cell. *Capsule* laterally compressed, 2-celled, loculicidal; margins toothed. *Seeds* albuminous; strophiole small or 0.

SALOMONIA OBLONGIFOLIA, DC.; F. B. I. i. 207. *S. obovata*, Wt. Ill. i. t. 22B.

A small, slender, simple or much-branched herb with angular stems, small elliptic or ovate-lanceolate leaves and long thin spikes of minute pink flowers, followed by didymous fruit with setose-dentate margins.

W. Coast, from S. Canara southwards; W. Gháts, in Mysore at 2,000 to 3,000 ft., not common.

2. *Polygala*, Linn.

Herbs or rarely shrubs. *Leaves* alternate. *Sepals* usually persistent, the 2 inner larger, sometimes petaloid. *Petals* 3, united below with the staminal sheath, the lower boat-shaped and usually crested at the tip. *Stamens* 8; filaments united below into a split sheath; anthers opening by pores. *Ovary* 2-celled; ovules 1 in each cell, pendulous. *Capsule* 2-celled and -seeded, loculicidal. *Seeds* with a waxy 3-fid or cup-shaped and 3-toothed caruncle, often expanded above into 1-3 short or long narrow membranous wings or into broad appendages covering the seed; albumen rarely absent.

Caruncle appendages nearly or quite covering the seed; large or small shrubs:—

Flowers yellow, in drooping terminal racemes; capsule fleshy, glabrous; leaves lanceolate, 4-6 in. long 1. *arillata*.

Flowers pink, in erect axillary racemes; capsule pubescent; leaves obovate, under 1.5 in. long.....2. *javana*.

Caruncle appendages narrow or absent; herbs, sometimes a little woody at the base:—

Caruncle cup-shaped, truncate or with 3 distant teeth:—

Bracts caducous; caruncle with 3 long linear appendages; capsule broadly winged; flowers blue 3. *sibirica*.

Bracts persistent; appendages of caruncle short or 0:—

Linear leaves, short few-flowered racemes and small green flowers, erect; often annual 4. *rosmarinifolia*.

Leaves and flowers spreading or drooping:—

Stems, racemes, and capsules with stiff white spreading bulbous-based hairs; flowers greenish or pinkish; outer sepals narrow, caudate-acuminate.....5. *bolbothrix*.

White bulbous-based hairs absent:—

Racemes under 1 in. long, dense; flowers yellow

6. *chinensis*.

Racemes 2 or more in. long, peduncled; flowers yellow; outer sepals ovate, rounded at the top 7. *elongata*.

Caruncle 3-fid to the base, sinuses very narrow, curved:—

Capsule winged; wing-petals obovate, membranous:—

Racemes long, tail-like, terminal; bracts caducous; wings narrow, few-veined 8. *leptalea*.

Racemes mostly lateral; bracts persistent; flower rose-coloured; wings large, broad, petaloid 9. *persicariaefolia*.

Capsule wingless; wing-petals falcate, herbaceous:—

Racemes less than 1 in. long:—

Capsule downy throughout; flowers yellow, 17-25 in. long; wing-petals densely pubescent, triangular; bracts persistent; leaves thin 10. *erioptera*.

Capsule glabrous; flowers 1 in. long, greenish; wing-petals subglabrous, oblique; bracts caducous; leaves fleshy

11. *telephioides*.

Racemes over 2 in. long 12. *Wightiana*.

1. POLYGALA ARILLATA, Ham.; F. B. I. i. 200; W. & A. 39.

W. Ghâts, in forests throughout the Range above 4,000 ft.

A large graceful shrub, reaching 12 ft. in height.

2. POLYGALA JAVANA, DC.; F. B. I. i. 201; W. & A. 38.

Hills of the Deccan in Cuddapah, Coimbatore, S. Arcot and Madura; W. Ghâts from Malabar to Tinnevely; up to 5,000 ft.

A branching undershrub.

3. POLYGALA SIBIRICA, Linn.; F. B. I. i. 205. *P. Heyneana*, W. & A. 38 (not of Wall.).

W. Ghâts from the Nilgiris to Tinnevely, chiefly above 6,000 ft.

4. POLYGALA ROSMARINIFOLIA, W. & A. 37; F. B. I. i. 204.

N. Circars, Hills of Vizagapatam; W. Ghâts from Coimbatore to Tinnevely; Hills of Salem.

5. POLYGALA BOLBOTHRIX, Dunn. *P. ciliata*, W. & A. 38 (not of Linn.).

W. Ghâts, from Coimbatore to Tinnevely.

6. POLYGALA CHINENSIS, Linn.; F. B. I. i. 204. *P. arvensis*, Willd.; W. & A. 36. *P. Rothiana*, W. & A. 37. *P. tranquebarica*, Mart.; W. & A. 37.

In all dry Districts from the plains to 3,000 ft.; scarce or absent from the W. Coast.

7. POLYGALA ELONGATA, Klein; F. B. I. i. 203; W. & A. 38.

Dry Districts of the Deccan and Carnatic from Bellary southwards.

8. POLYGALA LEPTALEA, DC.; F. B. I. i. 202.

N. Circars, in Ganjam; Nilgiris and Hills of Coimbatore.

9. POLYGALA PERSICARIAEFOLIA, DC.; F. B. I. 202. *P. Wallichiana*, Wt. Ill. i. t. 22A.

Hills of Mysore and Coimbatore above 4,000 ft.;

W. Gháts from Nilgiris to Travancore, about 4,000 to 5,000 ft.

10. *POLYGALA ERIOPTERA*, DC.; F. B. I. i. 203. *P. Vahlia*na, DC.; W. & A. 36. *P. triflora*, W. & A. 37 (Linn. ?).

Dry parts of the N. Circars in Vizagapatam and Godavari; dry Deccan and Carnatic Districts from the Kistna river southwards.

11. *POLYGALA TELEPHIODES*, Willd.; F. B. I. i. 205; W. & A. 36. Carnatic, in Nellore and Chingleput; Travancore.

12. *POLYGALA WIGHTIANA*, Wall.; W. & A. 38.

W. Carnatic, in Coimbatore and Madura.

3. *Xanthophyllum*, Roxb.

Large trees. *Leaves* large coriaceous, often yellowish green. *Sepals* subequal, 5. *Petals* 4-5, nearly equal, the lower one keeled, not crested. *Stamens* 8, 2 hypogynous, the remainder adnate to the base of the petals. *Ovary* 1-celled, stipitate; ovules 4-16, various in insertion and direction. *Fruit* 1-celled, indehiscent, 1-seeded. *Seeds* exalbuminous, estrophiolate.

XANTHOPHYLLUM FLAVESCENS, Roxb. Cor. Pl. iii. t. 248; F. B. I. i. 209; W. & A. 39.

A large timber tree with stout oblong-lanceolate leaves and finely tomentose terminal panicles of white or yellowish flowers, followed by globular thick-walled rugose green fruits 5-8 in. in diam.

W. Gháts from the Nilgiris southwards, up to 4,000 ft.

Wood yellowish, hard and close-grained. Vern. *Tam.* Mattei; *Mal.* Madakka.

Family XVII. CARYOPHYLLACEAE.

Herbs, sometimes a little woody at the base. *Leaves* opposite, usually quite entire; stipules scarious, setaceous or 0. *Flowers* bisexual or rarely unisexual. *Sepals* 4-5, free and imbricate in bud or united into a toothed calyx. *Petals* 4-5, entire toothed or bifid, sessile or clawed, or sometimes 0. *Stamens* 8-10, rarely fewer, inserted with the petals and sometimes slightly adherent to them; anthers 2-celled, cells parallel, dehiscing lengthwise. *Disk* annular or glandular or elongated into a gynophore. *Ovary* free, 1-celled or imperfectly 3-5-celled; styles 2-5, free or connate, stigmatose on the inner side; ovules 2 or many on a free central

or a basal placenta. *Fruit* a dry capsule, dehiscing by teeth or valves equal to or double in number to the styles or rarely indehiscent or irregularly dehiscent. *Seeds* few or many, rarely solitary; albumen mealy or rarely fleshy; embryo usually curved round the albumen; cotyledons frequently incumbent.

Calyx gamosepalous, 4-5-lobed; petals long-clawed; styles distinct; leaves ovate:—

Styles 2; leaves clasping the stem; pedicels long and slender

1. **Saponaria.**

Styles 3; leaves narrowed below; pedicels very short 2. **Silene.**
Sepals free; petals subsessile or 0:—

Stipules 0; styles free; capsule 3-10-toothed; leaves ovate or oblong (except *Sagina*):—

Leaves ovate or oblong:—

Capsule long, often curved, with 6-10 short teeth; petals shortly notched or 0; pubescence scattered 3. **Cerastium.**

Capsule short, straight, splitting to below the middle into 3-5 blunt lobes; petals split to the base or entire or 0; pubescence in a line on the stems:—

Petals split to the base or 0 4. **Stellaria.**

Petals entire 5. **Arenaria.**

Leaves linear, petals entire, minute or 0; capsule 4-5-valved to the base 6. **Sagina.**

Stipules setaceous or scarious; styles 3, united below (except *Spergula*); capsule 3-valved; leaves linear-subulate to obovate:—

Stipules small, scarious; petals entire; styles distinct; leaves linear-subulate 7. **Spergula.**

Stipules setaceous or linear, forming an interpetiolar fringe; petals 2-6-fid; styles 3-fid; leaves ovate 8. **Drymaria.**

Stipules and bracts conspicuous, shining, scarious; petals entire or toothed; styles united; leaves linear-lanceolate or spatulate:—

Sepals keeled; style 3-fid 9. **Polycarpon.**

Sepals terete; style 3-toothed 10. **Polycarpaea.**

1. **Saponaria**, Linn.

Annuals. *Leaves* flat. *Flowers* in dichotomous cymes. *Calyx* tubular or inflated, 5-toothed; obscurely nerved. *Petals* 5, clawed; limb obovoid. *Stamens* 10. *Disk* produced into a very short gynophore. *Ovary* 1-celled or imperfectly 2-3-celled; styles 2-3; ovules many. *Capsule* broadly ovoid, 4-toothed. *Seeds* globose.

SAPONARIA VACCARIA, Linn.; F. B. I. i. 217. *Gypsophila Vaccaria*, Sin.; W. & A. 42.

An erect glabrous annual with rose-coloured erose petals and stem-clasping leaves.

A weed of cultivation, occasional only.

2. *Silene*, Linn.

Herbs. *Flowers* solitary or cymose, frequently secund. *Calyx* tubular campanulate or inflated, 10- rarely many-nerved. *Petals* 5, with narrow claws; limb entire bifid or laciniate, usually with 2 basal scales. • *Stamens* 10. *Disk* usually produced into a long gynophore. *Ovary* incompletely 3-celled or rarely 1-celled; styles 3 or rarely 5; ovules many. *Capsule* 3-6-toothed or -valved. *Seeds* reniform, usually tubercled; embryo annular.

SILENE GALLICA, Willd.; F. B. I. i. 218.

A simple or branched, erect, hairy annual; flowers in long secund racemes, the lower ones shortly pedicelled; petals small, white.

An introduced weed, Coimbatore, Madura and Nilgiris.

3. *Cerastium*, Linn.

Herbs, usually pubescent. *Leaves* usually small. *Flowers* white, in terminal dichotomous cymes. *Sepals* 5 or rarely 4. *Petals* as many, notched or 2-fid, rarely entire, sometimes 0. *Stamens* 10, rarely fewer. *Ovary* 1-celled; styles 3-5; ovules many. *Capsule* cylindric, often curved near the top, dehiscing by short teeth, double in number to the styles. *Seeds* compressed, with an annular embryo.

Leaves lanceolate, acute, over 1 in. long; flowers shorter than the pedicels, which are uniformly pubescent; tips of the capsule-teeth revolute 1. *indicum*.

Leaves small, ovate, obtuse; flowers longer than their pedicels; capsule-teeth straight with revolute margins 2. *glomeratum*.

CERASTIUM INDICUM, Wight & Arn. 43; F. B. I. i. 227; Wt. Ill. i. t. 26.

Nilgiri, Anamalai and Pulney Hills, above 6,000 ft.

CERASTIUM GLOMERATUM, Thuill. *C. vulgatum*, W. & A. 43; Wt. Ic. t. 948. *C. vulgatum*, Linn. (partly); F. B. I. i. 228.

W. Gháts, from S. Canara and Mysore southwards, above 6,000 ft.

4. *Stellaria*, Linn.

Herbs. *Flowers* in dichotomous cymes or rarely solitary and terminal, white. *Petals* 5 or rarely 4, 2-fid or 2-partite or 0. *Stamens* 10, rarely 8. *Disk* annular or glandular. *Ovary* 1- rarely 3-celled; styles 3, rarely 2-5; ovules usually numerous. *Capsule* short, splitting to below the middle into entire or bifid valves equalling in number the styles. *Seeds* compressed, tubercled, granular or smooth; embryo annular.

Plants with simple hairs:—

Leaves 1-2 in. long, petiole 1-2 in. long; flowers in long-stalked paniculate cymes; seed solitary, wrinkled 1. *paniculata*.

Leaves under 1 in. long, lower petioles as long as the leaves; flowers mostly solitary, axillary; seeds numerous, tubercled

2. *media*.

Plants with stellate tomentum 3. *saxatilis*.

1. *STELLARIA PANICULATA*, Edgew.; F. B. I. i. 229. *S. media*, W. & A. 42 (not of Linn.)

W. Gháts, in Nilgiris at 8,000 ft.

2. *STELLARIA MEDIA*, Linn.; F. B. I. i. 230; Wt. Ic. t. 947.

W. Gháts, in the Nilgiris, Anamalais and Pulneys; Shevaroy's in Salem District; usually above 7,000 ft. Chickweed.

3. *STELLARIA SAXATILIS*, Ham.; F. B. I. i. 232.

About Ootacamund in Nilgiris, 7,000 to 8,000 ft.

5. *Arenaria*, Linn.

Herbs. *Flowers* white or pink, solitary or in dichotomous cymes. *Sepals* 5. *Petals* 5, entire lacerate or retuse never 2-fid or 2-partite, sometimes 0. *Stamens* 10, rarely 5. *Disk* lobed or annular. *Ovary* 1-celled; styles (2-)3-4; ovules usually many. *Capsule* rarely longer than the sepals, 2-6-valved. *Seeds* smooth or tubercled.

ARENARIA NEELGERRENSIS, Wight & Arn. 43; F. B. I. i. 239; Wt. Ic. t. 949.

A small procumbent herb with long rather stiff branches terminating in paniculate bracteate racemes of small flowers with entire white petals; leaves ovate, apiculate, 2-5 in. long.

Nilgiris, above 6,000 ft.

Arenaria serpyllifolia, Linn., was formerly found near Madras.

6. *Sagina*, Linn.

Small herbs. *Leaves* linear-subulate, connate at the base, exstipulate. *Flowers* small, globose, solitary, axillary and terminal, pedicelled. *Sepals* 4-5. *Petals* 4-5, entire or 0. *Stamens* 4-10, perigynous. *Ovary* 1-celled; styles 4-5; ovules numerous. *Capsule* 4-5-valved to the base. *Seeds* reniform.

SAGINA PROCUMBENS, Linn.; F. B. I. i. 242.

A small annual with many branches from near the base, short linear acute leaves and small globose flowers on long slender cymose pedicels.

Nilgiri Hills, above 6,000 ft.

7. *Spergula*, Linn.

Herbs with forked or fascicled branches. *Leaves* often apparently whorled; stipules small scarious. *Flowers* in peduncled paniculate cymes. *Sepals* 5. *Petals* 4, entire. *Stamens* 5 or 10, rarely fewer. *Ovary* 1-celled; styles 3-5, ovules many. *Capsule* with 3-5 entire valves. *Seeds* margined or winged.

SPERGULA ARVENSIS, Linn.; F. B. I. i. 243.

A loosely-branched annual weed with whorl-like clusters of narrow linear leaves and large irregular terminal cymes of long-stalked flowers. Seeds brown or black, papillose.

A weed of cool climate cultivation, Nilgiri and Pulney Hills above 6,000 ft.

8. *Drymaria*, Willd.

Diffuse glabrous herbs. *Leaves* roundish; stipules of several bristles. *Flowers* in axillary and terminal cymes. *Sepals* 5. *Petals* 5, 2-6-fid. *Stamens* 3-5. *Ovary* 1-celled; style 3-fid; ovules 3 or more. *Capsule* 3-valved to the base. *Seeds* orbicular, muricate.

DRYMARIA CORDATA, Willd.; F. B. T. i. 244; W. & A. 359.

A diffuse glabrous herb with nearly orbicular 3-5-nerved leaves and slender inflorescence.

W. Gháts, from S. Canara and Mysore southwards, up to 4,000 ft., in shady places.

9. Polycarpon, Linn.

Diffuse or erect and dichotomously branched herbs. *Leaves* opposite or from the presence of axillary fascicles appearing whorled; stipules scarious. *Flowers* crowded, with many scarious bracts. *Sepals* 5, keeled. *Petals* 5, small, hyaline, entire or notched. *Stamens* 3-5. *Ovary* 1-celled; style short, 3-fid. *Seeds* many, ovoid; embryo nearly straight.

Perennial with all the flowers subsessile 1. *Loeflingiae*.

Annual with the older flowers shorter than their pedicels

2. *tetraphyllum*.

1. POLYCARPON LOEFLINGIAE, Benth. & Hook. f.; F. B. I. i. 245.

Hapalosia Loeflingiae, Wall.; W. & A. 358.

Fields and waste places in various Districts.

2. POLYCARPON TETRAPHYLLUM, Linn.; Hook. f. Stud. Fl. B.

Isles 63.

Nilgiri Hills, an introduced weed.

10. Polycarpaea, Linn.

Herbs, usually erect. *Leaves* subulate, linear or spatulate; stipules scarious. *Flowers* numerous, in lax or contracted cymes. *Sepals* 5, often coloured, scarious throughout or, rarely, at the margins only. *Petals* 5, entire toothed or erose. *Stamens* 5, free or coherent with the petals. *Ovary* 1-celled; style slender, 3-fid or 3-toothed; ovules numerous. *Capsule* 3-valved. *Seeds* obovoid or compressed. *Embryo* curved, rarely straight.

Leaves spatulate, in rosettes at the root and at the internodes; flowers spicate at the ends of subumbellate branches 1. *spicata*.

Leaves subulate, not forming rosettes; flowers in irregular cymes:—

Plant shortly tomentose; cymes dense or lax:—

Erect annual or subperennial herb of sandy places; leaves flat with leaf-fascicles in the axils; stipules much fimbriate, .15 in. long; internodes with scattered hairs; sepals white, .1-2 in. long

2. *corymbosa*.

Much-branched shrub of rock crevices; leaves with inrolled margins; leaves in axils few or 0; stipules hardly fimbriate, .05 in. long; internodes densely white-tomentose; sepals coloured, .1 in. long 3. *aurea*.

Plant glabrous; cymes lax; stipules .03 in. long 4. *diffusa*.

1. *POLYCARPÆA SPICATA*, W. & A.; F. B. I. i. 246; Wt. Ic. t. 510.

Tuticorin in Tinnevelly.

2. *POLYCARPÆA CORYMBOSA*, Lam.; F. B. I. i. 245; Wt. Ic. t. 712; W. & A. 358. *P. spadicea*, Lam.; W. & A. 357.

Fields, waste places and sandy river banks in most dry Districts, especially in the Deccan and Carnatic; more scarce on the W. Coast.

3. *POLYCARPÆA AUREA*, W. & A. *P. corymbosa*, var. *aurea*, Wt. Ill. ii. 44, t. 110; F. B. I. i. 245.

Rocky places in the Deccan Hills, Gunjur, Kurnool, Bellary, Cuddapah, N. Arcot, Chingleput, at 2,000 to 4,000 ft.

4. *POLYCARPÆA DIFFUSA*, W. & A.; F. B. I. i. 245; Wt. Ill. ii. 44.

Near Tuticorin in Tinnevelly.

Family XVIII. PORTULACACEÆ.

Herbs or shrubs, usually succulent and glabrous. *Leaves* entire; stipules scarious or setose. *Flowers* regular, hermaphrodite. *Sepals* 2, imbricate. *Petals* 4-5, free or connate at the base, imbricate, fugacious. *Stamens* 4 or indefinite; filaments slender; anthers 2-celled. *Ovary* 1-celled, free or half-inferior; style 2-8-fid; ovules 2 or many, from the base of the ovary or from a central column. *Capsule* dehiscent in 2-8 valves or circumsciss, rarely indehiscent. *Seeds* 1 or more, usually with a curved embryo surrounding a mealy albumen.

Diffuse herbs, with small terminal solitary or clustered yellow flowers surrounded by a whorl of leaves; ovary half-adnate ...1. **Portulaca**.

Erect shrubby plants, with terminal panicles of moderate-sized purple flowers; ovary free.....2. **Talinum**.

1. *Portulaca*, Linn.

Herbs, usually succulent. *Leaves* with scaly or hairy stipules. *Flowers* terminal, surrounded by a whorl of leaves. *Sepals* joined below, free part deciduous. *Petals* 4-6. *Ovary* half-inferior; style 3-8-fid; ovules numerous. *Capsule* circumsciss, crustaceous. *Seeds* many, reniform.

Nodes without scales or hairs; leaves cuneate-oblong to linear, 3-1.5 in. long; flowers clustered 1. *oleracea*.

Nodes surrounded by lanceolate scales; leaves ovate-lanceolate; flowers solitary 2. *Wightiana*.

Nodes clothed with few or abundant hairs:—

Leaves lanceolate to ovate; flowers solitary, half sunk in the enlarged end of the pedicel and surrounded by 4 involueral leaves

3. *quadrifida*.

Leaves terete or linear; flowers clustered; abundant brown hairs round the flowers and, usually, at the nodes:—

Stems many, diffuse from the top of a fusiform fleshy root; leaves linear, margined; hairs plentiful and conspicuous.....4. *tuberosa*.

Stem erect from a stout branched annual root; leaves terete; hairs short and inconspicuous 5. *suffruticosa*.

1. *PORTULACA OLERACEA*, Linn.; F. B. I. i. 246; W. & A. 356.

In all dry Districts, a prostrate succulent herb.

2. *PORTULACA WIGHTIANA*, Wall.; F. B. I. i. 247; W. & A. 356.

Dry Districts of the Deccan and Carnatic from the Godavari southwards, usually on rocks and up to 2,500 ft.

3. *PORTULACA QUADRIFIDA*, Linn.; F. B. I. i. 247; Wt. Ill. ii. t. 109.

Roadsides and waste places in most Districts.

4. *PORTULACA TUBEROSA*, Roxb.; F. B. I. i. 247.

Dry Districts of the S. Carnatic from S. Arcot to Travancore.

5. *PORTULACA SUFFRUTICOSA*, Wight; F. B. I. i. 247; W. & A. 356.

Carnatic Districts from Coimbatore and S. Arcot to Travancore, up to 3,500 ft.

2. *Talinum*, Adans.

Succulent shrubs. Leaves flat, exstipulate. Flowers paniced. Petals 4-5, hypogynous. Stamens numerous. Ovary superior; style 3-fid; ovules many. Capsule globose, 3-valved. Seeds radiate-striate, strophiolate.

TALINUM CUNEIFOLIUM, Willd.; F. B. I. i. 247. *T. indicum*, W. & A. 356.

A small shrubby plant with obovate-cuneiform leaves, purple flowers and pea-like fruit.

Carnatic at "Chimmanackmoor" (Chinnanayakanur?) (W. & A.).

Family XIX. TAMARISCACEAE.

Mostly bushes or small trees. •Leaves minute, scale-like, rarely sheathing, sometimes fleshy, stipules 0. Flowers usually spicate or in crowded racemes, small, regular. Sepals and petals 5 each or rarely 4, sometimes a little connate below. Stamens 5-10 or many, free or connate below. Disk 10-glandular. Ovary free, 1-celled or imperfectly 2-5-celled; styles 2-5, free or connate; ovules 2-many on each of the 2-5 basal placentas. Capsule 3-valved. Seeds erect, plumed with a crest of long hairs or winged; albumen floury or 0; embryo straight.

Tamarix, Linn.

Leaves amplexicaul or sheathing. Flowers in lateral or terminal spikes or close racemes, white or pink. Stamens 4-10; anthers apiculate. Ovary narrowed upwards; styles 3-4, short, dilated into stigmas above. Seeds with a sessile plume, exalbuminous; embryo ovoid.

Young twigs covered by the minute imbricating leaf-blades, which ultimately spread showing their amplexicaul but not sheathing bases; flowers .08 in. long, in long narrow paniced racemes; capsule valves .12 in. long; stamens 5 1. *gallica*.

Young twigs covered by the short cylindric leaf-sheaths:—

Flowers .08 in. long, in narrow terminal spikes; capsule valves .15 in. long; stamens 5 2. *dioica*.

Flowers .2 in. long in a long terminal raceme; valves of capsule .4 in. long; stamens 10 3. *ericoides*.

1. TAMARIX GALLICA, Linn.; F. B. I. i. 248; W. & A. 40: Brand. For. Fl. t. 5.

Sandy river-beds in the Deccan and on the E. Coast, Godavari, Anantapur.

A gregarious shrub or small tree. Bark rough; wood reddish with broad medullary rays, a good fuel. Vern. Hind. Jhau; Tel. Palivi; Tam. Kiri.

2. TAMARIX DIOICA, Roxb.; F. B. I. i. 249; W. & A. 40; Brand. For. Fl. t. 6. *T. gallica*, Wt. Ill. i. t. 24A (not of Linn.).

Sandy river-beds and on the sea-coast, apparently very scarce.

A gregarious shrub or small tree, used for fuel.

8. TAMARIX ERICOIDES, Rottk; F. B. I. i. 249. *Trichaurus ericoides*, W. & A. 40.; Wt. Ill. i. t. 24B; Wt. Ic. t. 22.

Beds of rivers in the Circars, Deccan and Carnatic, usually inland and often in forest regions.

A beautiful shrub, not gregarious, often associated with other river-bed shrubs like *Rhabdia* and *Homonoya riparia*.

Family XX. ELATINACEAE.

Small aquatic or terrestrial herbs or small shrubs. *Leaves* opposite or whorled, stipulate. *Flowers* small, axillary, regular, hermaphrodite. *Sepals* and *petals* 2-5, free, imbricate. *Stamens* as many as the petals or twice as many. *Ovary* 2-5-celled; styles 2-5. *Ovules* numerous, axile. *Capsule* septicidal; valves separating from the axis and septa. *Seeds* straight or curved, often rugose; albumen 0 or scanty; embryo cylindric; cotyledons small.

Leaves entire; *sepals* 3; small aquatic herbs with solitary axillary flowers 1. **Elatine.**

Leaves serrate or crenate; *sepals* 5; stout erect terrestrial plants, with solitary or more or less densely clustered flowers 2. **Bergia.**

1. *Elatine*, Linn.

Small aquatic creeping herbs. *Leaves* opposite or whorled. *Flowers* minute, usually one at each node. *Sepals* 2-4, membranous, obtuse. *Petals* 2-4. *Ovary* globose. *Capsule* membranous; valves separating from the septa. *Seeds* curved, ridged and pitted.

Flowers subsessile; *stamens* exceeding the *sepals* 1. *americana*.

Flowers shorter than their pedicels; *stamens* shorter than the *sepals*

2. *ambigua*.

1. ELATINE AMERICANA, Arn.; F. B. I. i. 250.

Prostrate in patches on mud, Nilgiris.

2. ELATINE AMBIGUA, Wight; W. & A. 41; Wt. Ill. i. t. 25B; F. B. I. i. 251.

Prostrate in patches on mud, Madras.

2. *Bergia*, Linn.

Terrestrial or aquatic herbs, annuals or undershrubs. *Leaves* opposite, usually serrate. *Flowers* axillary, solitary or fascicled,

minute. *Sepals* acute, with membranous margins. *Capsule* 3-5-celled.

Succulent aquatics; leaves 1-1.5 in. long, crenate; flowers crowded, pink; stamens 10 1. *capensis*.

Stiff erect terrestrial plants; leaves 3-8(-1.5) in. long, serrate:—

Flowers 1-4 together, pink; stamens 10.....2. *aestivosa*.

Flowers red, in dense clusters; stamens 3-5 3. *ammannioides*.

1. *BERGIA CAPENSIS*, Linn. *B. verticillata*, Willd.; F. B. I. i. 252. *B. aquatica*, Roxb. Cor. Pl. ii. 22, t. 142. *Elatine verticillata*, W. & A. 41.

Carnatic, from Chingleput to Trichinopoly.

A glabrous succulent herb of rice-fields and the margins of tanks.

2. *BERGIA AESTIVOSA*, W. & A. 41; F. B. I. i. 251. *Elatine aestivosa*, Wt. Ic. t. 222.

Carnatic, about Madras.

3. *BERGIA AMMANNIoidES*, Roxb.; F. B. I. i. 251; Wt. Ill. i. 25A. *Elatine ammannioides*, W. & A. 41.

Marshy places in most Districts.

Family XXI. HYPERICACEAE.

Shrubs or herbs, rarely trees. *Leaves* opposite or, rarely, alternate, often marked with transparent or black dots, exstipulate. *Flowers* solitary or cymose, terminal or, rarely, axillary, yellow red or white. *Sepals* and *petals* (4-) 5 each; petals contorted in bud. *Stamens* indefinite, free or variously combined into 3 or 5 bunches or rarely all connate. *Ovary* 3-5-carpelled, 1- or 3-5-celled; styles free or connate; ovules few or many on axile or parietal placentas, or rarely solitary basal. *Fruit* a septicidal or rarely loculicidal capsule or an indehiscent berry. *Seeds* exarillate, exalbuminous.

Shrubs with yellow flowers 2-3 in. across, or herbs; capsule septicidal; seeds wingless 1. **Hypericum**.

Shrubs with pink flowers, 5 in. across; capsule loculicidal; seeds winged 2. **Cratoxylon**.

1. **Hypericum**, Linn.

Herbs, shrubs or small trees. *Leaves* usually sessile. *Flowers* cymose, yellow, usually terminal. *Sepals* 5. *Petals* 5, usually

somewhat oblique at the top. *Ovary* 1-celled with 3 or 5 parietal placentas or 3-5-celled with axile placentas; styles free or connate; ovules usually many. *Capsule* septicidal or, when 1-celled, splitting through the placentas.

Shrubs 4-8 ft. high, with flowers 2-3 in. across:—

Styles exceeding the ovary in length; young branches 4-angled

1. *mysorensse*.

Styles much shorter than the ovary; young branches terete

2. *Hookerianum*.

Herbs with flowers under 1 in. across:—

Sepals with gland-tipped teeth 3. *Wightianum*.

Sepals entire:—

Leaves sessile, auricled, 3-nerved; stamens monadelphous; ovary 1-celled..... 4. *japonicum*.

Leaves shortly stalked, penninerved; stamens 3-adelphous; ovary 3-celled 5. *humifusum*.

1. *HYPERICUM MYSORENSE*, Heyne; F. B. I. i. 253; W. & A. 99.

Norisca mysorensis, Wt. Ic. t. 56.

W. Gháts in the Nilgiris Anamalais Pulneys and Travancore Hills, above 5,000 ft.

A large shrub, conspicuous on the open grassy "downs."

2. *HYPERICUM HOOKERIANUM*, W. & A. 99; F. B. I. i. 254; Wt. Ic. 949.

W. Gháts, Nilgiris above 7,000 ft.

A handsome shrub, rather scarce, in Shola forests.

3. *HYPERICUM WIGHTIANUM*, Wall.; W. & A. 99. *H. napaulense*, Dyer in F. B. I. i. 256 (excepting characters of pistil) not of Choisy.

W. Gháts in the Nilgiris and Pulneys, about 7,000 ft.

4. *HYPERICUM JAPONICUM*, Thunb.; F. B. I. i. 256; W. & A. 99.

N. Circars, Hills of Ganjam; W. Gháts from Nilgiris to Travancore, above 5,000 ft.

5. *HYPERICUM HUMIFUSUM*, Linn.; F. B. I. i. 255.

W. Gháts, in Nilgiris.

2. *Cratoxylon*, Blume.

Shrubs or trees. *Leaves* entire, thin. *Flowers* in terminal, or axillary cymes. *Sepals* and *petals* each 5. *Stamens* 3- or 5-adelphous, the bundles separated by fleshy glands. *Ovary* 3-

celled; styles distinct; ovules 4-8 in each cell. *Capsule* dehiscing by 3 loculicidal valves. *Seeds* winged.

CRATOXYLON POLYANTHUM, Korth; F. B. I. i. 257.

N. Circars, Anakapalle in Vizagapatam (Barber).

A glabrous shrub with fluted stems.

Family XXII. GUTTIFERAE.

Trees or shrubs with yellow or greenish juice. *Leaves* opposite or, rarely, verticillate, usually coriaceous and exstipulate. *Flowers* solitary or in axillary or terminal fascicles racemes or panicles, white yellow or red, regular, dioecious polygamous or hermaphrodite. *Sepals* and *petals* 4-12, imbricate in 2-3 series. ♂. *Stamens* usually indefinite; filaments 1-6-adelphous or quite free. ♀. *Staminodes* numerous, free or connate. *Ovary* 1-2- or many-celled; style 1 usually short or 0 or rarely styles 2; stigmas free or connate, often peltate, as many as the cells; ovules 1 or 2 or many, axile basal or rarely parietal. *Fruit* usually indehiscent and baccate, occasionally capsular. *Seeds* large; albumen 0; embryo with large radicle and small cotyledons or vice versa.

Ovary of many 1-ovuled cells; style short or 0; cotyledons minute or 0; veins of leaves often close, but never all equal and parallel:—

Calyx of 4-5 sepals.....1. **Garcinia.**

Calyx bursting into 2 valves 2. **Ochrocarpus.**

Ovary 1-celled 1-ovuled or 2-celled 4-ovuled; styles 1 or 2, slender; cotyledons large; veins of leaves very close and parallel:—

Style 1; stigma peltate:—

Flowers racemose; ovary 1-celled, 1-ovuled 3. **Calophyllum.**

Flowers solitary; ovary 2-celled, 4-ovuled 4. **Mesua.**

Styles 2; stigmas acute; ovary 2-celled, 4-ovuled...5. **Poeciloneuron.**

1. **Garcinia, Linn.**

Trees or shrubs, often with yellow juice. *Leaves* coriaceous, sometimes only thinly so; stipules usually 0. *Flowers* solitary fascicled umbelled or panicled, polygamous or dioecious. *Sepals* 4-5. *Petals* 4-5, imbricate. ♂. *Stamens* numerous, free or

cence longitudinal or circumscrib. ♀. *Staminodes* free or connate in groups. *Ovary* 2-12-celled; stigma subsessile, peltate lobed or entire, smooth or tubercled; ovules solitary on the inner angle of each cell. *Berry* with tough rind enclosing several large seeds enclosed in a pulpy aril.

Flowers 4-merous:—

Leaves lanceolate to ovate:—

Stigma rayed:—

Flowers over 1.5 in. across; stamens in 4 masses...1. *Mangostana*.

Flowers under 1 in. across; stamens in 1 mass:—

Leaves oval, obtuse, with very close and parallel nerves

2. *echinocarpa*.

Leaves mostly lanceolate, acuminate, nerves not very close:—

Trees with ♂ flowers:—

Anthers peltate, circumscrib.....3. *Morella*.

Anther-cells contiguous, dehiscing longitudinally:—

Pedicels 1-1.5 in. long.....4. *indica*.

Pedicels .3-.7 in. long; leaves usually oblanceolate obtuse 5. *Cambogia*.

Anther-cells distant, adnate to a thick square connective; pedicels .2-.3 in. long 6. *Cowa*.

Trees with ♀ flowers:—

Staminodes in 4 bundles:—

Flowers shortly peduncled; ovary terete.....4. *indica*.

Flowers sessile; ovary grooved 6. *Cowa*.

Staminodes in an irregular ring:—

Ovary terete; stigmas sessile 3. *Morella*.

Ovary grooved; stigmas stalked 5. *Cambogia*.

Trees with fruit:—

Fruit .7 in. across 3. *Morella*.

Fruit over 3 in. across:—

Fruit grooved to about the middle 5. *Cambogia*.

Fruit grooved to the top 6. *Cowa*.

Fruit not grooved 4. *indica*.

Stigma entire; stamens monadelphous; leaves oblanceolate, caudate-acuminate, cuneate at the base; veins close, ascending ...7. *Imberti*.

Leaves linear-lanceolate or linear-oblong:—

Leaves caudate; veins distant, ascending; stigma rayed

8. *Wightii*.

Leaves blunt; veins close, transverse; stigma entire

9. *travancorica*.

Flowers 5-merous, from the axils of fallen leaves:—

Leaves 9-18 in. long, linear-oblong; pedicels 1-1.5 in. long; fruit pointed, 3-4 in. across.....10. *tinctoria*.

Leaves under 8 in. long; oval; pedicels 2-5 in. long; fruit broadly oblong, 1-2 in. across:—

Flowers .5-1 in. across, opening in the cold season...11. *malabarica*.

Flowers 2-3 in. across, opening in the hot season.....12. *spicata*.

1. *GARCINIA MANGOSTANA*, Linn.; F. B. I. i. 260.

Cultivated on the W. Coast and some other localities as at the Barliyar Garden on the E. Nilgiri slope, The Mangosteen.

2. *GARCINIA ECHINOCARPA*, Thwaites; F. B. I. i. 264.

Moist forests of S. Travancore and Tinnevely at 3,000 to 5,000 ft.

A handsome evergreen tree with hard reddish-brown wood.

Vern. *Mal. Pára*.

3. *GARCINIA MORELLA*, Desr.; F. B. I. i. 264; Bedd. Fl. t. 86.

G. pictoria, Roxb.; Wt. Ic. t. 102; Bedd. Fl. t. 87.

G. elliptica, Wall.; Wt. Ic. t. 120. *G. Gutta*, Wt. Ill. i. 126.

W. Gháts from S. Canara and Mysore to Travancore up to 3,000 ft. The Indian Gamboge tree.

A moderate-sized tree of the evergreen forests with greyish-yellow very hard wood. The Gamboge is rarely, if at all, collected in India. Vern. *Tam. Makki*; *Mal. Chigiri*.

4. *GARCINIA INDICA*, Choisy; F. B. I. i. 261.

W. Gháts in S. Canara, Coorg and Wynaad, but no specimens seen.

A slender tree with drooping branches and edible fruit commonly planted in the Bombay Presidency as an oil producer (Cooke, Watt.).

5. *GARCINIA CAMBOGIA*, Desr.; F. B. I. i. 262; Roxb. Cor. Pl. iii.

t. 298; W. & A. 100; Bedd. Fl. t. 85. *G. papilla*, Wt. Ic. t.

960, 961. *G. conicarpa*, Wt. Ic. t. 121.

W. Gháts from Coorg to Travancore, up to 6,000 ft., in evergreen and lower Shola forests.

A common small evergreen tree; wood pale grey, not used.

Vern. *Tam. Kodakkapuli*; *Mal. Kodapuli*, Pinaru.

6. *GARCINIA COWA*, Roxb.; F. B. I. i. 262; W. & A. 101.

Nilgiris and elsewhere (Brandis); occurrence in the Peninsula doubtful (W. & A.)

7. *GARCINIA IMBERTI*, Bourd. in Journ. Bomb. Nat. Hist. Soc. xii. 349, Trees Trav. 24.

W. Gháts in S. Travancore above 3,000 ft.

A medium-sized tree with grey very hard wood, not used.

Vern. *Tam.* Manja kánji.

8. *GARCINIA WIGHTII*, T. Anders.; F. B. I. i. 265.

W. Ghát forests, in Coimbatore and Travancore up to 2,000 ft.

A small tree with white moderately hard wood, and a gamboge gum said to be soluble and of good quality.

Vern. *Mal.* Pali maranga.

9. *GARCINIA TRAVANCORICA*, Bedd. Fl. t. 173; F. B. I. i. 268.

W. Gháts, in the evergreen forests of S. Travancore and Tinnevely about 3,500 ft.

A medium-sized ornamental tree with yellowish-white wood having a small brown streaked heartwood. Vern. *Mal.* Malampongu.

10. *GARCINIA TINCTORIA*, Dunn. *G. Xanthochymus*, Hook. f.; F. B. I. i. 269. *Xanthochymus pictorius*, Roxb. Cor. Pl. ii. t. 196 (not *Garcinia pictoria*, Roxb.); Bedd. Ic. t. 88. *X. tinctorius*, DC.; W. & A. 102.

N. Circars, Mahendragiri Hill in Ganjam, 4,500 ft.; W. Gháts in Mysore, Coorg, Nilgiris and N. Travancore up to 3,500 ft.

A handsome evergreen tree with greyish-brown very hard wood. Vern. *Mar.* Jharambi; *Tel.* Iwara mamadi; *Tam.* Mukki; *Kan.* Deva garige; *Mal.* Anavaya.

11. *GARCINIA MALABARICA*, Talbot in Journ. Bomb. Nat. Hist. Soc. xi. 234, t. 1. *G. ovalifolia*, Hook. f. var. *macrantha*, Anders. in F. B. I. i. 269.

W. Gháts in S. Canara, Mysore and Coimbatore.

A small or moderate-sized tree.

12. *GARCINIA SPICATA*, Hook. f. *G. ovalifolia*, Hook. f.; F. B. I. i. 269. *Xanthochymus ovalifolius*, Roxb.; W. & A. 102. *X. spicatus*, W. & A. 102.

E. Coast in various places as in Ganjam and Nellore; common in Striharikota forest, S. Arcot and Pudukota;

W. Gháts and W. Coast from S. Canara to Travancore at low elevations only.

An elegant moderate-sized evergreen tree with yellowish-white hard wood. Vern. *Mar.* Haldi; *Tam.* Kokottai; *Mal.* Manja nángu.

2. *Ochrocarpus*, Thouars.

Trees with thick leaves and flowers solitary or fascioled on nodes in the axils of fallen leaves. *Calyx* bursting into 2 or 3 valves which are reflexed during flowering. *Petals* 4. *Stamens* many, free or nearly so; anthers erect, oblong. *Ovary* 2-celled; style subulate; stigma 3-lobed; cells 2-ovuled. *Berry* ovoid, mucronate, 1-seeded, stipitate. *Seed* large; embryo with large radicle (tigellus) and cotyledons small or 0.

OCHROCARPUS LONGIFOLIUS, Benth. & Hook. f.; F. B. I. i. 270; Bedd. Fl. t. 89. *Calysaccion longifolium*, Wt. Ic. t. 1999.

A tree with large oblong leaves and clusters of white flowers 7 in. across; berries 1 in. long.

W. Gháts in Malabar and Coimbatore; cultivated in N. Circars and elsewhere.

A large evergreen tree with hard red wood. Vern. *Mar.* Suringi; *Kan.* Wúndi, Punay, Suringi.

3. *Calophyllum*, Linn.

Trees. *Leaves* opposite, coriaceous, with very close numerous parallel nerves at right angles with the midrib. *Flowers* polygamous, solitary fascioled racemed or paniced, axillary or terminal. *Sepals* and *petals* usually 4 each, imbricate. *Stamens* many, free or connate at base; anthers erect, dehiscence longitudinal. *Ovary* 1-celled; style slender; stigma peltate; ovule 1, erect. *Drupe* with a fleshy or crustaceous pericarp. *Seed* ovoid or globose.

Perianth segments 4 only; petioles under 5 in. long; fruit elliptic, 5 in. long.....1. *decipiens*.

Sepals and petals 4 each; petioles 5-1 in. long; fruit 1 in. long:—

Leaves under 2 in. broad; fruit ovoid, apiculate:—

Young parts more or less tomentose; inflorescence pubescent; leaves 3-5 in. long.....2. *elatum*.

Whole tree glabrous; leaves under 2 in. long.....3. *trapezifolium*.

Leaves 2-3 in. broad; whole tree glabrous; fruit 1 in. in diam., globular.....4. *inophyllum*.

1. *CALOPHYLLUM DECIPiens*, Wight Ic. t. 106. *C. Wightianum*, Wall.; F. B. I. i. 274; Bedd. Fl. t. 90. *C. spurium*, W. & A. 103 (probably not of Choisy).

Forests of W. Ghâts from Mysore to Travancore at low elevations up to 1,000 ft.; banks of rivers and backwaters on W. Coast.

A moderate-sized tree with reddish-brown useful wood. Vern. Mar. Bobbi; Kan. Irai; Mal. Cherupinna.

2. *CALOPHYLLUM ELATUM*, Bedd. Fl. t. 2. *C. tomentosum*, T. Anders. F. B. I. i. 274 (partly, not of Wight).

W. Ghâts from Nilgiris to Travancore and Tinnevely, at 1,000 to 5,000 ft.; W. Coast from S. Canara southwards.

The Poon Spar tree of India. A tall evergreen tree, unbranched to a great height with deeply cracked yellow bark and reddish-brown wood, used for masts of native vessels, but not in very great demand. Vern. Tam. Katta pinnei; Mal. Katta pinna, pinnapai.

3. *CALOPHYLLUM TRAPEZIFOLIUM*, Thw.; F. B. I. i. 275.

Evergreen forests of S. Travancore and Tinnevely at about 4,000 ft.; S. Canara.

4. *CALOPHYLLUM INOPHYLLUM*, Linn.; F. B. I. i. 278; W. & A. 103; Wt. Ill. i. t. 77.

E. and W. Coasts, a littoral species, much cultivated and often found run wild, perhaps not truly indigenous in India.

The Alexandrian Laurel. A moderate-sized very ornamental tree with a reddish-brown useful wood. The fruits are collected and sold for the extraction of oil. Vern. Hind. Sultana champa; Ur. Poonang; Mar. Undi; Tam. Pinnai; Tel. Pina; Mal. Pinna.

4. *Mesua*, Linn.

Trees. Leaves opposite, thick, often with transparent dots; nerves very numerous and slender, at right angles to the midrib. Flowers polygamous or hermaphrodite, large, solitary or in pairs, axillary or terminal. Sepals 4. Petals 4. Stamens numerous; anthers large, elongated, erect. Ovary 2-celled; style long; stigma peltate; 2 erect ovules in each cell. Fruit usually woody, subtended by the lignified sepals, 1-celled, tardily 2-4-valved. Seeds 1-4, without an aril.

MESUA FERREA, Linn.; F. B. I. i. 277; W. & A. 102; Wt. Ic. t. 118. *M. speciosa*, Chois.; Wt. Ic. t. 961. *M. pedunculata*, Wt. Ic. t. 119. *M. coromandelina*, Wt. Ic. t. 117; Bedd. Fl. t. 64.

A medium-sized or large tree with lanceolate, oblong or linear leaves, white fragrant flowers and ovoid greenish woody fruit. The size of the leaves (2-6 in. long), their colour beneath (white or green), the diameter of the flowers (1-4 in.) and of the fruit (1-2.5 in.) are very variable.

Forests of the W. Gháts from S. Canara to Travancore, up to 5,000 ft.

A common, handsome, and conspicuous tree with a very hard red wood, so hard that it is difficult to work, and therefore little used. Vern. *Tel.* Naga kesara; *Mar.* Nagchampa; *Kan.* Naga sampige; *Tam.* Nángu; *Mal.* Nánga.

5. Poeciloneuron, Bedd.

Trees. *Leaves* linear-oblong to lanceolate, thick; nerves close-set and parallel with fine reticulation between them. *Flowers* yellowish. *Sepals* 4-5, imbricate. *Petals* 5-6, contorted. *Stamens* numerous; filaments free or nearly so, short or 0; anthers elongated, erect. *Ovary* 2-celled; styles 2, subulate, stigmatic at the tips; ovules 2 in each cell, ascending. *Capsule* ovoid, 1-celled, 1-seeded. *Seed* exalbuminous; cotyledons fleshy; radicle minute, inferior.

Flowers in a terminal panicle; sepals 5; anthers lobulate on the margins 1. *indicum*.

Flowers solitary, axillary; sepals 4; anthers plain on the margins
2. *pauciflorum*.

1. POECLONEURON INDICUM, Bedd.; F. B. I. i. 278; Bedd. Fl. t. 3.

W. Gháts from S. Canara and Mysore to Travancore up to 4,000 ft.

A large evergreen, sometimes gregarious tree with a hard reddish-brown wood, useful for large timber purposes.

Vern. *Kan.* Kirballi; *Tam.* Puthangkolli; *Mal.* Vayila.

2. POECLONEURON PAUCIFLORUM, Bedd. Fl. t. 93; F. B. I. i. 278.

W. Gháts of Travancore and Tinnevely at 2,000 to 4,500 ft.

A large evergreen tree with a hard reddish wood. Vern. *Tam.* Puthangkolli; *Mal.* Puli vayila.

Family XXIII. TERNSTROEMIACEAE.

Trees or shrubs, sometimes climbing. *Leaves* usually coriaceous and simple, alternate, penninerved, serrate or entire, rarely stipulate. *Flowers* axillary, solitary or fascicled, or in terminal or axillary racemes or panicles or springing from the trunk, regular, 2- rarely 1-sexual. *Sepals* usually 5, free or shortly connate, imbricate or very rarely valvate. *Petals* usually 5, usually connate and much imbricate. *Stamens* usually indefinite and adnate to the base of the petals, sometimes monadelphous; 2-locular, erect, basifixed. *Disk* 0. *Ovary* free or rarely $\frac{1}{2}$ -inferior, 3-5-many-celled; styles as many as the cells, free or connate. *Ovules* 1, 2 or many in each cell. *Fruit* a berry or capsule. *Seeds* with or without albumen.

Leaves entire, obovate, obtuse; flowers .8 in. across; fruit a large berry.....1. **Ternstroemia**.

•Leaves crenate or serrate:—

Flowers very small in axillary fascicles; fruit a berry.....2. **Eurya**.

Flowers 1.5 in. across, solitary; fruit dehiscing by 5 valves spreading from a central column 3. **Gordonia**.

1. **Ternstroemia**, Linn.

Glabrous evergreen trees or sometimes shrubs. *Leaves* coriaceous, usually entire. • *Flowers* usually dioecious, solitary or fascicled, axillary or lateral; peduncles often recurved and 2-bracteate. *Sepals* 5. *Petals* 5, connate at the base like the sepals, broadly imbricate. *Stamens* in the ♂ and bisexual flowers numerous. *Ovary* 2-3-celled, rarely incompletely so; cells usually 2-ovulate; ovules pendulous; stigmas 2-3, subsessile, often lobed. *Berry* with a thick rind. *Seeds* large, horseshoe-shaped or oblong; albumen rarely absent.

TERNSTROEMIA JAPONICA, Linn.; F. B. I. i. 280. *Cleyera gymnanthera*, W. & A. 87; Wt. Ic. t. 47; Bedd. Fl. t. 91.

Flowers pale yellow, .7 in. across, in the axils of the leaves or of fallen leaves or lateral on the branchlets. Berries 2-seeded,

reddish, apiculate, 5 in. in diam. Leaves obovate, 2-4 in. long.

W. Gháts, in Shola forests of Nilgiris to Travancore, above 3,000 ft.

A moderate-sized evergreen handsome tree with reddish-brown smooth wood. Vern. *Nilg.* Kiamonu.

2. Eurya, Thunb.

Shrubs or small trees. Leaves glabrous or slightly pubescent, usually crenate-serrate. Flowers dioecious, in small axillary clusters or, rarely, solitary; pedicels short. Sepals and petals 5 each, imbricate, expanding but little. Stamens in ♂ flower 5-15, usually about 12. Ovary 2-5-celled, with as many free or united styles; ovules many, from the axis in each cell. Fruit a small globular or ovoid berry. Seeds usually very small, angled or pitted; albumen fleshy.

EURYA JAPONICA, Thunb.; F. B. I. i. 284; Bedd. Fl. t. 92.

E. tristyla, W. & A. 86. *E. Wightiana*, Wt. Ill. i. t. 38.

A shrub or tree with small white flowers, 2 together; ends of twigs sharply angular.

W. Gháts, in Shola forests from S. Canara to Travancore, common above 3,000 ft.

Wood brown, close-grained, a good fuel. Vern. *Nilg.* Huluni.

3. Gordonia, Ellis.

Trees, sometimes large, with evergreen leaves. Flowers solitary, axillary, usually towards the ends of the branches. Sepals usually 5, unequal and often passing gradually into the bracteoles. Petals sometimes much larger than the sepals and thin in texture. Stamens many, 1- or 5-adelphous, adnate to the base of the petals. Ovary 3-6-celled; style usually solitary, ribbed or angled with a spreading stigma; ovules 4-8 in each cell. Fruit an oblong, woody, loculicidal capsule with 4-5 flat or grooved valves separating from a persistent axis. Seeds winged; albumen 0; embryo with ovate cotyledons.

GORDONIA OBTUSA, Wall.; F. B. I. i. 291; W. & A. 87; Wt. Ill. i. t. 39.

A tall tree with grey bark and large white flowers.

W. Gháts, in all Districts in the drier Shola forests, chiefly

of the E. side, usually from 5,000 to 7,000 ft., lower in Travancore.

Wood reddish, hard and close-grained, but little used. Vern. *Nilg. Nagetta*.

Camellia Thea, Link., the Tea Plant, is much cultivated, especially in the Nilgiri and Travancore Mountains.

Family XXIV. DIPTEROCARPACEAE.

Resinous trees. *Leaves* alternate, entire or rarely crenate, penninerved, usually with small stipules. *Flowers* regular, hermaphrodite, usually sweet-scented, in racemes or panicles. *Calyx* free and campanulate or short and adnate to the ovary. *Petals* contorted. *Stamens* numerous, 15, 10 or 5, variously connate or free; filaments usually short and often dilated below; connective often produced into an appendage above. *Ovary* usually slightly adherent to the calyx, 3 (-1)-celled; style usually quite entire; ovules lateral or basal, 2 in each cell. *Fruit* an indehiscent nut or a 3-valved capsule usually enclosed in the accrescent calyx and often winged by the elongation of 2 or more of the sepals. *Seeds* 1(-2), exalbuminous; cotyledons fleshy.

Stipules amplexicaul, scars encircling the twigs; calyx tubular; fruit with 2 long wings 1. **Dipterocarpus.**

Stipules not amplexicaul; sepals nearly free:—

Bases of the inner sepals nearly hidden by the outer in flower and fruit; sepals erect in fruit and enclosing the nut; anthers with long awns (except in *Shorea robusta* and *S. Tumbuggaia*):—

Sepals developing in fruit into long erect wings:—

Wings 2.....2. **Hopea.**

Wings 3 3. **Shorea.**

Sepals accrescent but shorter than the fruit or developing into short spreading wings.....4. **Balanocarpus.**

Bases of the sepals equally exposed in flower and fruit; anther points short or 0:—

Sepals ovate-lanceolate, acuminate; flowers in axillary racemes

5. **Yatica.**

Sepals linear, obtuse; flowers in terminal panicles 6. **Vateria.**

1. **Dipterocarpus**, Gaertn. f.

Trees, often of great height, more or less clothed with tawny stellate pubescence. *Leaves* coriaceous, margins entire or undu-

late, lateral nerves looped and connected by transverse reticulation; petiole often swollen just below the leaf-blade; stipules encircling the stem, falling early and leaving an annular scar. *Flowers* large, white or reddish, racemed or paniced. *Calyx* with a free tubular base. *Petals* valvate, pubescent. *Stamens* numerous; anthers elongated, acuminate. *Ovary* with 3 2-ovuled cells and a filiform style. *Fruit* a 1(-2)-seeded nut, enclosed in a smooth, ribbed, or reticulate accrescent calyx-tube with 2(-5) erect wings. *Cotyledons* large, thick, unequal.

Tube of fruiting calyx 5-winged; leaf-nerves below and young shoots clothed with spreading tomentum 1. *Bourdillonii*.
 Tube of fruiting calyx smooth; leaves subglabrous; young shoots with short adpressed tomentum 2. *indicus*.

1. DIPTEROCARPUS BOURDILLONI, Brandis in Hook. Ic. Pl. t. 2403.

W. Gháts: Carcoor Ghát in Malabar; N. and C. Travancore at low elevations.

A magnificent evergreen tree, reaching 150 ft. in height. Wood reddish brown, moderately hard. Vern. *Tam.* Kar ánjili; *Mal.* Charatta ánjili.

2. DIPTEROCARPUS INDICUS, Bedd.; Bedd. Fl. t. 94.

W. Coast and W. Gháts from S. Canara to Tinnevely, up to 3,000 ft., in evergreen forests.

A lofty evergreen tree, reaching 120 ft. in height. Wood reddish brown, hard, but not durable. Vern. *Kan.* Guga, Challane; *Tam.* Ennei; *Mal.* Kalpayin, Vellaini.

2. Hopea, Roxb.

Large resinous trees. *Leaves* entire; stipules small, deciduous. *Flowers* sessile or shortly pedicelled, ebracteate, in lax unilateral paniculate racemes. *Sepals* obtuse, imbricate, shortly united at the base. *Stamens* 15 or rarely 10, slightly connate; connective produced into a subulate point; anthers ovate. *Ovary* of 3 2-ovuled cells; style short, subulate. *Fruit* 1-seeded, closely surrounded by the bases of the accrescent sepals, the 2 external of which are developed into linear or oblong wings.

Panicles tomentose; leaves with 8-12 pairs of nerves:—

Petals glabrous; leaves ovate to oblong; wings of fruit 2.5 in. long, erect 1. *parviflora*.

Panicles glabrous; petals pubescent:—

Leaf-nerves 4-5 pairs; bark black, peeling in strips from below upwards; fruit-wings 6-9 in. broad.....2. *racophloea*.

Leaf-nerves 6-12 pairs; bark brownish; fruit-wings 3-4 in. wide
3. *Wightiana*.

1. *HOPEA PARVIFLORA*, Bedd.; F. B. I. i. 308; Bedd. Fl. t. 7.

Moist forests of the W. Coast and W. Gháts in all Ghát Districts, up to 3,000 ft.; often gregarious in hill forests, sporadic on river banks in plains ones.

A large handsome tree, with brown close-grained hard wood, valuable for building purposes and for railway sleepers Vern. *Kan.* Bovumara, Kiralboghi; *Tam.* Kóngu, Pongu; *Mal.* Thambagam.

2. *HOPEA RACOPHLOEA*, Dyer in F. B. I. i. 310. *H. malabarica*, Bedd. Ic. t. 185.

W. Gháts in the forests of S. Canara, Wynaad, and Travancore, up to 3,000 ft.

A moderate-sized tree with hard brown wood and characteristic bark. Vern. *Tam.* Karung kongu; *Mal.* Neduváli kongu.

3. *HOPEA WIGHTIANA*, Wall.; F. B. I. i. 309; W. & A. 85. *H. glabra*, W. & A. 85; F. B. I. i. 310; Bedd. Fl. t. 96.

Evergreen forests of the W. Coast from S. Canara southwards, often gregarious, especially in S. Canara.

A large tree with brown hard wood of good quality for timber. Vern. *Mar.* Kavsi; *Kan.* Haiga; *Tam.* Ila pongu.

3. *Shorea*, Roxb.

Resinous trees of great height or rarely of medium size or even shrubs. *Leaves* with the ultimate reticulation often inconspicuous; stipules often large, coriaceous or persistent. *Panicles* axillary or terminal. *Sepals* imbricate, united at the base into a very short tube. *Stamens* often 15 in 3 rows, rarely fewer, sometimes more numerous and occasionally as many as 100; anthers usually ovate or oblong with a subulate extension of the connective. *Ovary* of 3 2-ovuled cells; style subulate; stigma entire or minutely lobed. *Fruit* with a leathery, rarely woody, pericarp, 1-celled, 1-seeded, closely surrounded by the bases of the persistent, usually accrescent, sepals, the 3 outer of which (or rarely 5 or 0) are developed

into 7-10-veined reticulate membranous linear-oblong wings. *Cotyledons* fleshy, unequal.

Calyx glabrous in flower and fruit; stamens usually about 15; leaves elliptic with nerves close, under .25 in. apart 1. *Talura*.

Calyx pubescent in flower and fruit; stamens usually 30-50; leaves ovate, often cordate at base:—

Peduncle and rachis of panicle densely tomentose; petioles under 1 in. long; wings of fruit 6-8 times as long as the capsule; leaf-nerves usually over .5 in. apart; very gregarious.....2. *robusta*.

Peduncle and rachis of panicle nearly glabrous; petioles 1-2 in. long; wings of fruit 2-3 times as long as the capsule; leaf-nerves usually .25-.35 in. apart; sporadic or only partly gregarious...3. *Tumbuggaia*.

1. SHOREA TALURA, Roxb.; F. B. I. i. 304. *S. laccifera*, Heyne; Bedd. Fl. t. 6. *Vatica laccifera*, W. & A. 84; Wt. Ic. t. 164.

Forests of the E. Gháts and Deccan in Cuddapah, N. Arcot, Anantapur, Mysore, and Salem, up to 3,000 ft.; W. Gháts in Malabar, Coimbatore, and Madura, sporadic only and in hilly country.

A handsome tree with yellowish-brown valuable wood. Vern. *Tel.* Jalári; *Tam.* Talura, Talari.

2. SHOREA ROBUSTA, Gaertn.; F. B. I. i. 306; Roxb. Cor. PR iii. 312; Bedd. Fl. t. 4; Brand. For. Fl. t. 9.

N. Circars, forming large forests in Gumsúr Surada and the E. Ghát Range, up to 3,000 ft.; Palkonda Hills and Jeypore forests in Vizagapatam, and south to the Godavari, but scarce. The Sal tree.

A large gregarious forest tree with a brown but rough and rather cross-grained wood, valuable for building purposes and sleepers. Vern. *Hind.* Sal; *Ur.* Salwa; *Tel.* Gugal.

3. SHOREA TUMBUGGAIA, Roxb.; F. B. I. i. 306; Bedd. Fl. t. 5. *Vatica Tumbuggaia*, Wt. Ic. t. 27.

E. Gháts: forests of the Cuddapah, N. Arcot, and Chingleput Hills, up to 3,000 ft.

A large forest tree, sporadic or only partly gregarious, with a brown hard wood similar to Sal but much smoother and better for carpentry. It is much in demand in Cuddapah and N. Arcot. Vern. *Tam.* Tambagam; *Tel.* Themba.

4. *Balanocarpus*, Bedd.

Large trees, glabrous except the inflorescence. *Leaves* entire with minute deciduous stipules. *Flowers* in unilateral panicle racemes. *Calyx* lobes imbricate on a flat torus. *Stamens* (10-)15; filaments dilated at the base; anthers short, ovate, exceeded by the apical awn. *Nut* oblong or globose, apiculate, often marked by numerous raised lines, enclosed at the base by the thickened and accrescent sepals which often attain 1 in. in length and spread horizontally.

Leaves unequally cordate at the base; petals bilobed; fruit ovoid

1. *erosa*.

Leaves rounded at the base or acute; petals entire, pubescent, crenulate; fruit globose

2. *utilis*.

1. *BALANOCARPUS EROSA*, Bedd. For. Man. 237; Fl. t. 329.

Tinnevely Gháts, at 2,000 to 3,000 ft.

2. *BALANOCARPUS UTILIS*, Bedd. For. Man. 237; Fl. t. 330.

Hopea longifolia, Dyer, F. B. I. i. 309.

Tinnevely Gháts, S. of Courtallum, at 1,000 to 3,000 ft.

5. *Vatica*, Linn.

Large or medium-sized resinous trees. *Leaves* coriaceous, entire or a little undulate, finely reticulate; stipules small and caducous. *Flowers* axillary and terminal, usually paniculate and tomentose. *Calyx-tube* very short, adnate to the base of the ovary; segments slightly imbricate. *Stamens* 15; anthers oblong, apiculate. *Ovary* of 3 2-ovuled cells; style short; stigma entire or shortly 3-toothed. *Capsule* leathery, 3-valved, 1-2-seeded, attached to the spreading and often winged accrescent calyx.

VATICA CHINENSIS, Linn. *V. Roxburghiana*, Bl.; F. B. I. i. 302; Bedd. Fl. t. 95. *Vateria Roxburghiana*, Wt. Ic. t. 26.

A large evergreen tree with thin grey bark and ovate to oblong obtuse leaves having 10-14 pairs of nerves; petals 5 times as long as the calyx; stamens in 2 rows; fruit globose, shortly pointed, reticulate, surrounded at the base by the enlarged sepals.

W. Coast and W. Gháts at low elevations on the banks of rivers from S. Canara and Mysore to Travancore.

Wood reddish brown, hard and good, but little used. Vern. *Mal.* Vellei payin, Adakka payin.

6. *Vateria*, Linn.

Resinous trees. *Leaves* usually coriaceous. *Flowers* in terminal or lateral panicles or 1-3 on axillary peduncles. *Calyx* segments very shortly united at the base. *Stamens* 15 or about 50; anthers linear or oblong, connective usually muticous. *Ovary* of 3 2-ovuled cells; style subulate, entire or shortly lobed. *Capsule* 1-seeded, ovoid or globose, coriaceous or fleshy, indehiscent or 3-valved; calyx persistent, scarcely accrescent, reflexed around the pedicel. *Cotyledons* large, fleshy, unequal, enclosing the superior radicle.

VATERIA INDICA, Linn.; Fl. B. I. i. 313; Roxb. Cor. Pl. iii. t. 288; W. & A. 84; Wt. III. i. t. 36. *V. malabarica*, Bl.; Bedd. Fl. t. 84.

A very large evergreen tree; stem smooth, blotched with green and white; leaves ovate, with 14 pairs of nerves; flowers 8 in. across, white, fragrant, drooping in large panicles; fruit ovoid, rough, pale brown, 2 in. long.

Evergreen forests of the W. Ghâts from S. Canara to Tinnevely at low elevations, up to 2,500 ft. or sometimes higher, often planted. The Piney Varnish or Indian Copal tree.

Wood greyish brown, rough, not much used. The stems afford a resin and the seeds an oil. Vern. Kan. Dhupa, Gugli; Tam. Vallei kuntrikam; Tel. Dupada; Mal. Payin.

Family XXV. ANGISTROCLADACEAE.

Glabrous climbing shrubs with hooked branches. *Leaves* with entire coriaceous blades and short petioles; nerves pinnate and reticulate; stipules small and deciduous or 0. *Flowers* regular, bisexual, in axillary or (apparently) terminal racemes or panicles, mostly caducous; pedicels jointed at the top. *Calyx* enlarged in fruit; tube very short, adnate to the ovary; lobes 5, unequal, imbricate. *Petals* 5, unequal, contorted, slightly connate at the base. *Stamens* 5-10; filaments short, dilated at the base and there connate; anthers introrse. *Ovary* 1-celled, with one erect or lateral ovule; styles 3; stigmas terminal. *Nut* indehiscent, 1-seeded, mucronate, adnate to the calyx tube, and surmounted by the enlarged calyx lobes. *Seed* globose; albumen copious, fleshy, ruminant.

Ancistrocladus, Wall.

Flowers in branched panicles. *Stamens* 10. Other characters as described under the Family.

ANCISTROCLADUS HEYNEANUS, Wall.; F. B. I. i. 299; Wt. Ic. t. 1987-8.

W. Gháts, in most Districts, in evergreen forests.

Family XXVI. MALVACEAE.

Herbs, shrubs or rarely trees; stellate hairs often present. *Leaves* alternate, usually palmately, nerved, simple lobed or digitate; stipules free, caducous or 0. *Flowers* regular, bisexual or very rarely dioecious or polygamous, axillary, terminal, solitary, clustered or paniculate; bracteoles 2 or more, free or connate, often forming an involucre, sometimes 0. *Sepals* (3-4-5), valvate, more or less united into a lobed or truncate calyx. *Petals* 5, more or less adnate to the base of the staminal tube, twisted-imbricate or 0. *Stamens* many, rarely few, usually connate into a tube divided at the apex into numerous single pentadelphous or polyadelphous antheriferous filaments, or emitting from its outer surface sessile or stipitate anthers; anthers ultimately 1-celled. *Ovary* 2-many-celled, entire or lobed, of 2-many carpels; ovules 1 or more in each cell on the axis; styles distinct or connate; stigmas linear peltate or capitate. *Fruit* of dry indehiscent cocci separating from the central axis, or capsular and loculicidal, or rarely large woody and indehiscent. *Seeds* reniform or obovoid; albumen scanty or 0; embryo curved; cotyledons usually folded or crumpled.

Plants destitute of peltate scales:—

Leaves simple, entire, lobed, or palmatifid:—

Carpels separating from the axis at maturity:—

Styles as many as the carpels; staminal tube antheriferous at or to the top:—

Bracteoles 3:—

Carpels rounded, indehiscent, awnless:—

Leaves orbicular in outline, palmately veined and lobed; stigmas linear; flowers purple or whitish 1. **Malva**.

Leaves lanceolate, pinnately veined stigmas capitate; flowers yellow 2. **Malvastrum**.

Carpels truncate, dehiscent, 2-awned**Modiola**.

Bracteoles 0:—

Fruiting carpels spreading star-wise with points outwards; fruiting calyx flat; flowers^o purple **Anoda.**

Fruiting carpels erect, with the fruiting calyx appressed to them; flowers yellow:—

Carpels bursting irregularly, points not spreading; flowers opening in the morning 3. **Sida.**

Carpels dehiscing by a regular central line, forming a flat-topped fruit with radiating points; flowers opening in the evening 4. **Abutilon.**

Style-branches twice as many as the carpels; staminal tube antheriferous on the outside not at the top:—

Flowers capitate, 4-6 together in each involucre **Malachra.**

Flowers not in heads:—

Leaves with a large gland at the base of the midrib beneath; bracteoles or lobes of the involucre triangular-lanceolate; ripe carpels often glochidiate 5. **Urena.**

Leaves eglandular; bracteoles or lobes of the involucre ovate or setaceous; ripe carpels never glochidiate, but 1-3-aristate or bare 6. **Pavonia.**

Carpels not separating; fruit capsular:—

Bracteoles persistent and forming spreading wings to the fruit; anthers in 5 clusters; flowers polygamous 7. **Kydia.**

Bracteoles not spreading nor fimbriate (0 at the time of flowering in *Hibiscus ficulneus*):—

Capsule 10-valved 8. **Decaschistia.**

Capsule 5-valved 9. **Hibiscus.**

Bracteoles large, cordate, foliaceous, fimbriate or toothed

Gossypium.

Leaves digitate; trees:—

Trunk short, thick, unarmed; peduncles pendulous, 6-8 in. long; calyx 5-fid; stamens monadelphous **Adansonia.**

Trunk tall, armed at least when young; peduncles under 2 in. long; calyx truncate; stamens 5-adelphous:—

Flowers over 3 in. long; capsule thick, woody; bark soon grey

10. **Bombax.**

Flowers 1-1.5 long; capsule thin, leathery; bark remaining green for a long time 11. **Eriodendron.**

All herbaceous parts covered with peltate scales; trees:—

Flowers large, solitary, axillary; leaves cordate, ovate... 12. **Thespesia.**

Flowers small (for the Family), densely clustered on the old wood; leaves linear-lanceolate 13. **Cullenia.**

1. *Malva*, Linn.

Pubescent herbs. *Leaves* lobed. *Flowers* axillary, solitary or clustered, pedicelled. *Bracteoles* 3. *Staminal* tube divided at the top into numerous antheriferous filaments. *Ovary* many-celled; ovules 1 in each cell; styles as many as the cells, filiform. *Cocci* forming a round depressed fruit, separating when ripe from each other and from the axis, indehiscent, muticous.

Flowers 1.5 in. across, purple, on long peduncles; plant erect; petals 5 times as long as the sepals.....1. *sylvestris*.
Flowers not more than .5 in. across, shortly stalked; petals scarcely exceeding the sepals:—

Erect plant with bluish flowers in dense axillary clusters; carpels rounded at the edge 2. *verticillata*.

Low spreading plant with whitish flowers, few together on short peduncles in the leaf-axils; carpels with interlocking teeth; petal-claws glabrous 3. *parviflora*.

1. *MALVA SYLVESTRIS*, Linn.; F. B. I. i. 320. *M. mauritiana*, DC.; W. & A. 45.

Mysore (Heyne 1800); Madras (Bulkley 1703), a weed of cultivation.

2. *MALVA VERTICILLATA*, Linn.; F. B. I. i. 320. *M. rotundifolia*, Wt. Ic. t. 950 (not of Linn.). *M. neilgherrensis*, Wt. Ic. t. 950 (in text).

Nilgiris, Kotagiri, 6,000 ft. (Wight), a weed of cultivation.

3. *MALVA PARVIFLORA*, Linn.; F. B. I. i. 321.

Mysore, Madura (Wall. Cat. 1884 f).

2. *Malvastrum*, A. Gray.

Herbs or shrubs. *Leaves* entire or lobed. *Flowers* axillary or in a leafy terminal spike; bracteoles 3, narrow. *Calyx* cup-shaped, 5-parted. *Petals* longer than the sepals. *Staminal* tube bearing anthers on the outside up to the top. *Ovary* 5- or more-celled; styles as many as the cells; stigmas capitate. *Cocci* free at maturity, indehiscent, 1-seeded. *Seeds* ascending.

MALVASTRUM COROMANDELIANUM, Garcke. *M. tricuspidatum*, A. Gray; F. B. I. i. 321. *Malva coromandeliana*, Linn. Sp. Pl. 687.

A small erect branched shrub; stem and branches covered with stiff appressed hairs.

Madras, Kurnool, etc., a weed of roadsides and waste places.

3. *Sida*, Linn.

Herbs or undershrubs, pubescent with simple or stellate hairs. *Leaves* toothed; stipules linear. *Flower*-pedicels axillary, solitary or clustered, disarticulating in fruit at a joint below the calyx: bracteoles 0. *Sepals* 5, connate below. *Corolla* small, yellow or white. *Staminal* tube divided into numerous filaments at the top. *Ovary* 5-12-celled; ovules pendulous, 1 in each cell; styles as many as the carpels; stigmas terminal. *Fruit* depressed-globose, enclosed in the calyx; carpels separating from each other and from the axis. *Seeds* smooth. Fibre-yielding plants.

Whole plant velvety; awns of carpels exceeding the calyx, retrorse-hairy; carpels 10 1. *cordifolia*.

Plant pubescent or tomentose, not velvety; awns shorter than the calyx segments:—

Carpels 5; leaves cordate or truncate:—

Leaves acute; pedicels jointed in the middle:—

Stem trailing; leaves and slender branches sparingly hispid, not glutinous 2. *veronicaefolia*.

Stem erect; leaves and stoutish branches glutinous... 3. *glutinosa*.

Leaves obtuse; pedicels jointed near the flower 4. *spinosa*.

Carpels 6-10 (rarely 5 in *S. acuta*); leaves cuneate:—

Leaves small, cuneate-obcordate, entire 5. *Schimperiana*.

Leaves serrate:—

Leaves nearly glabrous; peduncle equal to the petiole ... 6. *acuta*.

Leaves pubescent-hoary; peduncle longer than the petiole:—

Peduncle jointed in the middle half; carpels awned

7. *rhombifolia*.

Peduncle jointed at the base; carpels usually muticous

8. *rhomboidea*.

1. *SIDA CORDIFOLIA*, Linn.; F. B. I. i. 324; W. & A. 58.

A weed of roadsides and waste land, in all Districts.

2. *SIDA VERONICAEFOLIA*, Lam. *S. humilis*, Willd.; F. B. I. i. 322; W. & A. 59.

A weed of waste places in all plains Districts.

3. *SIDA GLUTINOSA*, Cav. *S. mysorensis*, W. & A. 59; F. B. I. i. 322. *S. urticaefolia*, W. & A. 59.

A weed of waste places in all plains Districts.

4. *SIDA SPINOSA*, Linn.; F. B. I. i. 323. *S. alba*, Linn.; W. & A. 58.

A weed of waste places in Deccan and Carnatic Districts.

5. SIDA SCHIMPERIANA, Hochst.; F. B. I. i. 322. *Riedleia truncata*, W. & A. 66 (not of DC.).

E. Coast Districts at Madras, S. Arcot; Deccan, not common.

6. SIDA ACUTA, Burm.; W. & A. 57; Wt. Ic. t. 95. *S. carpinifolia*, Linn. f.; F. B. I. 323.

A weed of waste places, very common in all plains Districts, often also in woods.

7. SIDA RHOMBIFOLIA, Linn.; F. B. I. i. 323 (partly).

A weed of waste places, in all plains Districts.

8. SIDA RHOMBOIDEA, Roxb.; W. & A. 57. *S. rhombifolia*, Linn. var. *rhomboidea*, Masters in F. B. I. i. 324.

W. Coast Districts, S. Canara to Travancore; Mysore.

4. Abutilon, Gaertn.

Tomentose shrubs or herbs. *Leaves* usually cordate and long-petioled, dentate, rarely slightly lobed. *Flowers* solitary or rarely racemose paniculate or umbellate, on axillary peduncles which are jointed near the top, yellow or orange; involueral bracteoles 0. *Calyx* of 5 valvate sepals, united below into a short tube. *Corolla* of 5 imbricate petals, adnate below to the staminal tube. *Stamens* numerous, free above. *Carpels* 5-many; styles as many as the carpels; stigmas small, capitate. *Ripe carpels* ultimately separating from the short central axis, dehiscent, 1-5-seeded, usually acute or mucronate. *Seeds* reniform. Fibre-yielding plants.

Carpels 5, twice as long as the acuminate sepals; staminal tube short, hairy at the top; flowers 1.5 in. across, in terminal panicles.

1. *polyandrum*.

Carpels 8-10, hispid, .4 in. long; stem with close thin tomentum

2. *ramosum*.

Carpels 10-20 :—

Carpels pointed or mucronate :—

Stem with smooth close tomentum; carpels with thin tomentum and scattered tufts of stiff hairs, both eventually deciduous; seeds minutely furrowed, glabrous 3. *indicum*.

Stem with spreading hairs :—

Ripe carpels with dense spreading persistent shaggy hairs

4. *asiaticum*.

Ripe carpels shortly pubescent; seeds with minute white hairs

5. *hirtum*.

Carpels obtuse, without a mucro :—

Corolla 2 in. across ; staminal tube pubescent ; fruit densely silky

6. *glaucum*.

Corolla 5-1 in. across ; staminal tube glabrous :—

Fruit four times longer than the sepals, drooping, membranous, wrinkled 7. *crispum*.

Fruit less than twice as long as the sepals 8. *neilgherrense*.

1. ABUTILON POLYANDRUM, W. & A. 55 (not of G. Don) ; F. B. I. i. 325.

E. Gháts, Ganjam to Godavari ; W. Gháts, from Mysore to the Pulneys.

A common erect woody herb.

2. ABUTILON RAMOSUM, Guill. & Perr. ; F. B. I. i. 328 ; Cocke, Fl. Bomb. i. 98.

W. Coast, in Cochin (Meebold), a tall shrubby perennial.

3. ABUTILON INDICUM, G. Don ; F. B. I. i. 326 ; W. & A. 56 ; Wt. Ic. t. 12.

Common in all Districts, especially in the hills.

An erect woody herb.

4. ABUTILON ASIATICUM, G. Don ; F. B. I. i. 326 ; W. & A. 56.

E. Coast, in Chingleput District.

An erect herbaceous plant or small shrub.

5. ABUTILON HIRTUM, G. Don ; W. & A. 56. *A. graveolens*, W. & A. var. *hirtum*, Masters in F. B. I. i. 327. *A. graveolens*, W. & A. 56.

Common in almost all Districts.

An erect woody herb of waste places.

6. ABUTILON GLAUCUM, Cav. *A. muticum*, G. Don ; F. B. I. i. 327. *A. tomentosum*, W. & A. 56.

Bellary in the Deccan ; Tinnevely ; not common.

7. ABUTILON CRISPUM, G. Don ; F. B. I. i. 327 ; W. & A. 56 ; Wt. Ic. t. 68.

Deccan, from Hyderabad southwards ; Coromandel Coast Districts.

A weak diffuse annual.

8. ABUTILON NEILGHERRENSE, Munro ex Wt. Ill. i. 66.

Bellary in the Deccan ; Nilgiri Hills (Munro).

5. Urena, Linn.

Herbaceous perennials, covered with harsh tomentum. Leaves angled or lobed, with a large gland at the base of the midrib below.

Flowers sessile or shortly pedicelled; involucral bracts 5, connate at the base, adnate to the calyx-tube. *Sepals* 5, connate below into a campanulate tube. *Petals* 5, united below to the staminal tube. *Stamens* united into a narrow tube, bearing sessile or shortly stalked anthers below the apex. *Ovary* of 5 1-ovuled cells; style branches 10; stigmas capitate. *Ripe carpels* 5, smooth or covered with glochidiate spines, separating from the short axis, indehiscent.

Ripe carpels glochidiate:—

Leaves with slight obtuse lobes 1. *lobata*.

Leaves cut to the middle or beyond; lobes narrower at their base

2. *sinuata*.

Ripe carpels smooth; leaves roundish; flowers racemose ...3. *repanda*.

1. *URENA LOBATA*, Linn.; F. B. I. i. 329; W. & A. 46.

In most Districts, a weed of roadsides, forest clearings and waste places.

An undershrub, giving a fibre.

2. *URENA SINUATA*, Linn.; F. B. I. i. 329; W. & A. 46.

In most Districts, in woods and waste places, less common than the preceding.

An undershrub, giving a fibre.

3. *URENA REPANDA*, Roxb.; F. B. I. i. 330; W. & A. 46; Wt. III. i. 65.

N. Circars, in Ganjam Sál forests.

6. *Pavonia*, Cav.

Herbs or small shrubs. *Leaves* subentire, dentate, angled, lobed or pinnatifid. *Flowers* solitary, axillary or in terminal racemes; bracteoles 5 or many, free or a little connate at the base. *Calyx* 5-fid. *Petals* 5, connate at the base and adnate there to the staminal tube. *Stamens* monadelphous, becoming free in groups at various heights on the tube. *Ovary* of 5 1-ovuled cells; styles 10, with capitate stigmas. *Ripe carpels* separating from the axis, indehiscent or 2-valved; never glochidiate.

Bracteoles 5, ovate; carpels glabrous, muricate; flowers yellow

1. *procumbens*.

Bracteoles 8-12, setaceous; flowers pink or white:—

Carpels 3-angled, keeled at the edges, flat at the back, glabrous;

leaves more or less deeply lobed or pinnatifid 2. *zeylanica*.
 Carpels rounded at the back, usually pubescent; leaves seldom deeply
 lobed.....3. *odorata*.

1. PAVONIA PROCUMBENS, Boiss. *P. glechomifolia*, Garcke;
 F. B. I. i. 330. *Lebretonia procumbens*, Wall.; W. & A.
 47; Wt. Ic. t. 4.

Most Districts of the Circars, Deccan and Carnatic, but not
 common.

A prominent undershrub.

2. PAVONIA ZEYLANICA, Cav.; F. B. I. i. 330; W. & A. 47.

Circars and Carnatic from Godavari southwards, not
 common.

An erect branching undershrub.

3. PAVONIA ODORATA, Willd.; F. B. I. i. 331; W. & A. 47.

N. Circars, Deccan and Carnatic, in waste places and open
 woods, common.

A herbaceous branching weed.

7. Kydia, Roxb.

Trees with stellate tomentum. *Leaves* palminerved and usually
 lobed. *Flowers* paniced, polygamous; the bracteoles, stamens
 and styles varying in the different sexual forms; bracteoles 4-6,
 obovate or spathulate, shorter or longer than the calyx, accrescent
 and spreading in fruit and forming dry spathulate wings. *Sepals*
 5, divided to the middle into 5 ovate lobes, connivent and per-
 sistent over the fruit. *Petals* normally 5, unequally bilobed at the
 top. *Anthems* in clusters of 3-4 at the ends of 5 slender prolonga-
 tions of the staminal tube or in ♀ flowers reduced in number
 or 0. *Ovary* with (2-)3 2-ovuled cells; style with 3 branches.
Capsule 3-celled, loculicidal, depressed-globose, woolly. *Seeds*
 reniform, brown.

KYDIA CALYCINA, Roxb. Cor. Pl. iii. t. 215; F. B. I. i. 348; Wt.
 Ic. t. 879-80; W. & A. 70. Bedd. Fl. t. 3. *K. Roxburghiana*,
 Wt. Ic. t. 881. *K. fraterna*, Roxb. Cor. Pl. iii. t. 216; W. & A. 70.

Most Districts of the N. Circars and Deccan, in deciduous
 forests; scarce on the W. Coast.

A small or moderate-sized quick-growing tree with white soft
 wood of no value. Vern. *Hind.* Pula; *Ur.* Kopasia; *Mar.*
 Warang; *Tel.* Potri; *Kan.* Bendi.

8. *Decaschistia*, W. & A.

Tomentose shrubs. *Leaves* entire, serrate or lobed. *Flowers* shortly peduncled, axillary, solitary or clustered; bracteoles 10. *Sepals* 5, a little coherent at the base, lobes narrow, acute or acuminate. *Petals* connate at the base and adherent to the base of the staminal tube, broader above and twisted in imbrication. *Stamens* becoming free from the staminal tube at various heights. *Ovary* 10-celled, cells 1-ovuled; style divided near the top into 10 branches, with capitate stigmas. *Capsule* loculicidally 10-valved, depressed-globose. *Seeds* reniform.

Middle and lower leaves deeply trilobed; bracteoles not much more than half the length of the calyx 1. *triloba*.

Middle and lower leaves ovate or lanceolate:—

Leaves ovate, rounded or rarely obtuse at the apex, nearly entire; stem with rough spreading reddish hairs; seeds slightly pubescent

2. *rufa*.

Leaves ovate-lanceolate, acute, serrate or nearly entire, stem usually with short white tomentum; seeds quite glabrous.....3. *crotonifolia*.

1. *DECASCHISTIA TRILOBA*, Wt. Ic. t. 88; F. B. I. i. 332.

W. Gháts in S. Canara and Mysore.

An erect shrub.

2. *DECASCHISTIA RUFA*, Craib in Kew Bull. 1912, 35.

Carnatic, Tiruvallur and Kambakam Hill in Chingleput (Cleghorn), Peninsula (Wall. Cat. 1901 in part).

3. *DECASCHISTIA CROTONIFOLIA*, W. & A. 52; F. B. I. i. 332 (partly); Wt. Ic. t. 42.

Deccan, in open forests in Bellary, Mysore, Salem and Cuddapah, up to 2,500 ft.; E. side of W. Gháts in Nilgiris and Pulneys.

An erect shrub with large flowers.

9. *Hibiscus*, Medik.

Herbs, shrubs or rarely trees. *Leaves* stipulate, usually palmately lobed or cut. *Flowers* axillary, or rarely in a terminal raceme. *Bracteoles* 4–12 or rarely 0, usually free from each other and from the calyx. *Calyx* 5-lobed or 5-fid, valvate or spathaceous or circumsciss. *Petals* 5, connate at the base and adnate to the

staminal tube. *Staminal tube* truncate or 5-toothed at the top, giving off the free ends of the stamens at various heights. *Ovary* 5-celled; ovules 3 or more in each cell; styles 5, connate below; stigmas usually capitate. *Capsule* loculicidally 5-valved, 5-celled or rarely spuriously 10-celled. *Seeds* reniform globose or obovoid, glabrous velvety cottony or scaly.

Calyx spathaceous, splitting down one side and falling off at flowering-time; seeds striated; flowers yellow or white:—

Bracteoles linear, more than 6; seeds glabrous:—

Capsules lanceolate, narrowed to the base, 1–3 in. long; peduncles as long as the capsules; seeds 15 in. long, nearly globular

1. *Abelmoschus*.

Capsule elongate, attenuate above, truncate at the base, 6–10 in. long; peduncle many times shorter than the capsule; seeds ovoid, with close opaque striations.....*esculentus*.

Bracteoles ovate-lanceolate, 4–6 or (at the time of flowering) 0:—

Lobes of leaves obtuse, narrowed at their base; upper flowers in terminal leafless racemes; stem with minute thorns; bracteoles 5–6, fugacious 2. *ficulneus*.

Lobes of leaves acute (or in *H. Manihot* sometimes 0); bracteoles 4:—

Bracteoles persistent, distinct; nerves of leaves with a few appressed setae on both sides 3. *Manihot*.

Bracteoles connate nearly to the top at the time of flowering or split down one side, fugacious:—

Nerves of leaves thickly beset with spreading setae

4. *setinervis*.

Nerves of leaves tomentose 5. *angulosus*.

Calyx with 5 distinct teeth and persistent in flower; seeds glabrous or hairy:—

Stem and sepals with small thorns; sepals eglandular; bracteoles mostly forked or foliaceous at the tip; seeds glabrous:—

Stipules foliaceous, semisagittate 6. *surattensis*.

Stipules linear or 0 7. *furcatus*.

Stem and sepals unarmed, or, if with a few small prickles, then calyx-teeth and midrib of leaves with a large gland below:—

Seeds with long cottony hairs; flowers never yellow:—

Leaves acute, serrate, usually over 2 in. long, with a large gland on the midrib beneath; flowers scarlet; calyx-lobes 4 or 5 times longer than their tube 8. *hirtus*.

Leaves blunt, dentate, usually under 1 in. long; flowers white; calyx-lobes about twice as long as their tube.....9. *micranthus*.

Seeds exceeded in length by their frill of stiff spreading hairs; flowers red white or blue, never yellow:—

Flowers white, turning to red; leaves orbicular in outline, palmately lobed.....*mutabilis*.

Flowers purplish blue; leaves ovate from a cuneate base or 3-lobed and broader.....*syriacus*.

Seeds with short scattered bulbous-based hairs; flowers crimson; leaves lanceolate, serrate; staminal tube much exerted

Rosa-sinensis.

Seeds densely velvety, with short stiff adpressed or spreading hairs; flowers yellow:—

Tree with linear striate bracteolæ longer than the calyx; leaves subglabrous above.....10. *canescens*.

Herb; bracteoles shorter than the calyx; leaves densely pubescent above.....11. *panduræformis*.

Seeds covered with setulose scales; leaves with a large gland on the midrib beneath; bracteoles adnate to the base of the calyx, becoming fleshy and purplish.....*Sabdariffa*.

Seeds glabrous, sometimes with scattered adnate scales:—

Seeds uniformly tubercled:—

Herb with wingless capsules.....12. *Solandra*.

Shrub with winged capsules.....13. *vitifolius*.

Seeds smooth or with a few small tubercles:—

Calyx clothed with close white tomentum and bearing at the base of each lobe a large gland; leaves with a gland on the midrib below, palmatifid, or rarely without lobes...*cannabinus*.

Calyx without white tomentum and eglandular:—

Leaves entire or serrulate, orbicular, often cordate; bracteoles connate into a cup at the base; tree.....14. *tiliaceus*.

Leaves more or less lobed or cut:—

Herbs or a little woody at the base:—

Leaves palmatifid, lobes pinnatifid; calyx inflated, membranous.....15. *Trionum*.

Leaves with short pointed biserrulate lobes; stem, peduncles and acuminate capsules clothed with rigid pungent hairs.....16. *lunariifolius*.

Shrubs or undershrubs; leaves palmately lobed:—

Capsule depressed-globose, hispid; leaf-margins sinuate.....17. *platanifolius*.

Capsule oblong, acuminate; leaf-margins entire

18. *Lampas*.

1. **HIBISCUS ABELMOSCHUS**, Linn. *H. rugosus*, Mast. ; F. B. I. i. 342. *Abelmoschus rugosus*, Wall. ; W. & A. 53.
Deccan and Carnatic, in hilly regions.
2. **HIBISCUS FICULNEUS**, Linn. ; F. B. I. i. 340. *Abelmoschus ficulneus*, W. & A. 53 ; Wt. Ic. t. 154.
Circars, Deccan and Carnatic, not common, sometimes on black cotton soil.
A spreading annual with thick rootstock, giving a good fibre.
3. **HIBISCUS MANIHOT**, Linn. ; F. B. I. i. 341. *H. tetraphyllus*, Roxb. ; F. B. I. i. 341.
W. Coast from S. Canara to Travancore.
A large erect annual up to 6 ft. high.
4. **HIBISCUS SETINERVIS**, Dunn in Kew Bull. 1914, 324. *Abelmoschus angulosus*, W. & A. 53 (partly).
W. Gháts in Mysore, Malabar and Nilgiris, at about 3,000 to 6,000 ft.
An erect perennial herb with handsome flowers.
5. **HIBISCUS ANGULOSUS**, Steud. ; F. B. I. i. 341 (partly) ; Wt. Ic. t. 951.
W. Gháts, in the higher ranges from S. Canara to Travancore, up to 8,000 ft., usually near streams.
An erect perennial herb with handsome flowers.
6. **HIBISCUS SURATTENSIS**, Linn. ; F. B. I. i. 334 ; Wt. Ic. t. 197 ; W. & A. 48.
W. Coast from S. Canara to Tinnevely.
A prickly trailing plant with many branches.
7. **HIBISCUS FURCATUS**, Roxb. ; F. B. I. i. 335 ; W. & A. 48.
Rumpa Hills in Godavari at 2,000 ft. ; W. Coast and W. Gháts from Malabar and Nilgiris to Travancore, up to 3,000 ft.
A prickly trailing undershrub.
8. **HIBISCUS HIRTUS**, Linn. ; F. B. I. i. 335 ; W. & A. 51 ; Wt. Ic. t. 41.
N. Circars in Godavari District.
9. **HIBISCUS MICRANTHUS**, Linn. f. ; F. B. I. i. 335 ; W. & A. 51.
Almost all Districts, common.
A slender branching undershrub.
10. **HIBISCUS CANESCENS**, Heyne ; F. B. I. i. 337 ; W. & A. 49.
Deccan and Carnatic, apparently scarce.

11. *HIBISCUS PANDURAEFORMIS*, Burm.; F. B. I. i. 888; W. & A. 50.

Deccan and Carnatic, not common.

A tall herbaceous undershrub.

12. *HIBISCUS SOLANDRA*, L'Hérit.; F. B. I. i. 886. *Lagunaea lobata*, Willd.; W. & A. 55.

N. Circars, in Vizagapatam and Godavari; W. Gháts and Coast from S. Canara to Tinnevely.

An erect annual herb.

13. *HIBISCUS VITIFOLIUS*, Linn.; F. B. I. i. 888; W. & A. 50.

All Districts, common, up to 3,000 ft. in the Deccan.

An annual or biennial herb with yellow flowers.

14. *HIBISCUS TILIACEUS*, Linn.; F. B. I. i. 348. *Paritium tiliaceum*, W. & A. 52; Wt. Ic. t. 7.

W. Coast Districts along backwaters and tidal rivers from S. Canara southwards; perhaps also E. Coast in the Deltas of the Godavari and other rivers though not recorded in Herbaria available.

A much-branched tree with handsome flowers and soft wood. Vern. *Tam.*, *Mal.* Nir paratthi.

15. *HIBISCUS TRIONUM*, Linn.; F. B. I. i. 334. *H. vesicarius*, Cav.; W. & A. 48.

Deccan, in Anantapur, Mysore, Coimbatore and N. Nilgiris, common on black cotton soil.

An annual spreading herb.

16. *HIBISCUS LUNARIFOLIUS*, Willd.; F. B. I. i. 888; W. & A. 49; Wt. Ic. t. 6. *H. sidoides*, W. & A. 49.

E. Carnatic and W. Gháts from Mysore southwards, up to 3,000 ft.

A herbaceous erect perennial.

17. *HIBISCUS PLATANIFOLIUS*, Sweet. *H. collinus*, Roxb.; F. B. I. i. 888. *H. eriocarpus*, DC.; W. & A. 51.

N. Circars in Vizagapatam; Cuddapah forests; Salem, Tinnevely, sometimes cultivated in gardens.

A large shrub with handsome flowers. Vern. *Tel.* Kandagang.

18. *HIBISCUS LAMPAS*, Cav.; Wt. Ic. t. 5; W. & A. 48. *Thespesia Lampas*, Dalz. & Gibs.; F. B. I. i. 845.

N. Circars, Deccan and W. Gháts, in forest glades, up to 3,000 ft.

An undershrub up to 4 ft. high, with conspicuous yellow flowers. Vern. Tel. Kondapatli.

H. esculentus, L., is the "okra" or "bendekai" plant, commonly cultivated for its capsules, which are eaten as a vegetable. *H. Sabdariffa*, L., is the Roselle plant, cultivated for its fleshy enlarged red calyx, which is eaten in tarts or made into a jelly. *H. cannabinus*, L., is the Deccan hemp, cultivated for its valuable fibre. *H. mutabilis*, L., *H. syriacus*, L., *H. Rosa-sinensis*, L., and *H. radiatus*, L., are cultivated as garden plants.

10. Bombax, Linn.

Trees with buttressed trunks, clear of branches for a long distance from the ground. Leaves digitate; stipules small. Flowers out before the leaves appear, clustered towards the ends of the branchlets; bracteoles 0. Calyx leathery, cup-shaped, irregularly lobed. Petals 5, oblong obovate or linear. Stamens polyadelphous, very numerous; filaments often combined so that the cells appear to be 2 instead of 1. Ovary 5-celled; ovules numerous in each cell; style clavate, divided into 5 spreading stigmatic branches at the top. Capsule dehiscing by 5 leathery or woody deciduous valves. Seeds smooth, globose, imbedded in long white wool; albumen scanty; cotyledons crumpled.

Flowers about 3 in. long; stamens normally 80 in all, in 5 phalanges of 12 opposite the petals, with 10 thin ones behind and 5 large central double ones alternate with the petals, filaments flat; tree reaching 130 ft. in height; trunk with hard conical prickles; leaflets lanceolate, long- (about 1 in.) petioluled; capsule velvety.....1. *malabaricum*.

Flowers 5-7 in. long; stamens about 600, in 5 phalanges opposite to the petals, filaments threadlike; trees reaching 40 ft. in height:—

Leaflets obovate, cuspidate, petiolules under 3 in. long; trunk unarmed; branchlets sometimes prickly; capsule glabrous

2. *insigne*.

Leaflets lanceolate, acuminate, sessile; trunk with prickles in clusters of 1-12; capsule velvety.....3. *scopulorum*.

1. BOMBAX MALABARICUM, DC.; F.B. I. i. 349; W. & A. 61; Wt. Ill. t. 29; Bedd. Fl. t. 82. *B. heptaphyllum*, Roxb. Cor. Pl. iii. t. 247.

In all forest Districts, occasionally in open country, often cultivated. The Red Cotton tree.

A very conspicuous tree, of gigantic size in favourable localities, flowering when bare of leaves in the hot season. The wood is soft and perishable, but is more durable under water, and is therefore in use for sea-going boats. It gives a gum and an exudation used in medicine. The cotton surrounding the seeds is used for stuffing pillows, but is not so good as that of *Eriodendron*. Vern. *Hind.* Simal; *Ur.* Buroh; *Tel.* Buraga; *Tam., Mal.* Ilavu; *Mar.* Sayar; *Kan.* Burla, Sauri.

2. *BOMBAX INSIGNE*, Wall.; F. B. I. i. 349.

Anamalai Hills (Wight).

3. *BOMBAX SCOPULORUM*, Dunn. *B. insigne*, Bourd. Trees Trav. 45 (not of Wall.).

Travancore Hills, on rocks.

A small tree resembling *B. malabaricum*, but never attaining its size. Wood soft and white. Vern. *Tam., Mal.* Kal ilavu, Parei ilavu.

11. *Eriodendron*, DC.

Trees; trunk prickly when young; branches whorled. *Leaves* digitate, deciduous; stipules small. *Flowers* tufted, in the axils of leaves or appearing before them; bracteoles 0. *Calyx* campanulate, 5-toothed. *Petals* oblanceolate. *Staminal tube* short, dividing into 5 filiform branches, each bearing at the top 2 or 3 sinuous anthers. *Ovary* 5-celled; ovules many in each cell; style dilated into a shortly 5-lobed stigma. *Fruit* an oblong coriaceous 5-valved capsule woolly within. *Seeds* black, globose, enveloped in silky cotton; cotyledons crumpled.

ERIODENDRON PENTANDRUM, Kurz. *Eriodendron anfractuosum*, DC.; F. B. I. i. 350; W. & A. 61; Wt. Ic. t. 400.

A tall tree with smooth green stem and horizontal branches; leaflets 5-8, 3-4 in. long, petiolules very short; flowers white or yellowish, 1.5-2 in. across; capsule cylindric, 4-5 in. long, green.

Not indigenous but naturalized on the W. Coast and often planted there and elsewhere.

The White Cotton tree, giving the "Kapok" cotton used for pillows and cushions, and of better quality than that of *Bombax*. Vern. *Tam.* Panji; *Mal.* Panya.

12. Thespesia, Soland.

Trees, clothed in the younger parts with peltate scales. *Leaves* entire. *Flowers* solitary, axillary. Bracteoles 5, fugacious or 0. *Calyx* truncate, entire. *Petals* 5, convolute. *Staminal tube* toothed at the top, clothed except at the swollen base with the free ends of the filaments. *Ovary* 5-celled; ovules 2-3 in each cell; styles club-shaped, 5-furrowed. *Fruit* fleshy, very tardily dehiscent. *Seeds* few, large, striate with lines of adpressed soft hairs.

THESPESIA POPULNEA, Cav.; F. B. I. i. 345; W. & A. 54; Wt. Ic. t. 8; Bedd. Fl. t. 63.

A fairly large evergreen tree with cordate entire long-petioled leaves 3-5 in. each way and long-peduncled flowers 2-3 in. across, the petals yellow fading to purplish pink.

W. Coast near the sea-shore, very common and perhaps wild in S. Canara and Malabar, doubtfully so in Travancore, as also in E. Coast Districts. Often planted in avenues near the coast, occasionally inland. The Indian Tulip or Portia tree.

Wood dark red, hard and durable. Vern. *Tam.* Puvarasam; *Tel.* Gangareni; *Mar.* Bhendi; *Kan.* Huvarasi; *Mal.* Porasu.

13. Cullenia.

Lofty trees covered in the younger parts with peltate scales. *Leaves* oblong-lanceolate, penninerved, exstipulate. *Flowers* fascicled on the old wood; bracteoles 3-5, connate into a cylindric tube. *Calyx* tubular, toothed. *Petals* 0. Anthers clustered at intervals on the 5 branches of the *staminal tube*. *Ovary* 5-celled; ovules 2, superposed in each cell; style elongate, woolly; stigma capitate. *Fruit* a large globose spiny ultimately 5-valved capsule, containing a few large arillate exalbuminous seeds.

CULLENIA EXCELSA, Wt. Ic. t. 1761-2; F. B. I. i. 350.

A tall buttressed tree with a long smooth white fluted trunk below the branches; leaves simple, entire, 3-6 in. long; flowers brownish white, 1.5 in. long; fruit about 5 in. across, very spinous.

W. Ghâts from Coorg southwards, up to 4,000 ft., in evergreen forests.

Wood pale brown, soft, not durable. Vern. *Tam.* Vedupla; *Mal.* Kar aini.

Anoda hastata, Linn., is a blue-flowered herbaceous hispid introduced weed which has been found about Madras.

Malachra capitata, Linn., is a herbaceous weed occasionally found along the Carnatic coast. It is not indigenous and is recognized by the flowers in dense capitate heads.

Various races of *Gossypium arboreum*, *barbadense*, *herbaceum*, *hirsutum*, *Nanking*, *obtusifolium*, *purpurascens* constitute the cultivated cottons of the Presidency. For their identification and an account of them, reference should be made to Sir George Watt's "Commercial Products of India."

Adansonia digitata, Linn., the Baobab tree of Africa is found here and there in cultivation.

Family XXVII. STERCULIACEAE.

Herbs, shrubs or trees, the herbaceous parts usually clothed with stellate hairs. *Leaves* alternate, simple or digitate, entire toothed or lobed, usually stipulate. *Flowers* usually in axillary cymes, regular, 1- or 2-sexual. *Sepals* valvate, more or less combined below. *Petals* 5, hypogynous, free or connate at the base or 0. *Stamens* 5-many; filaments united into a tube or rarely free; anthers 1-5 together, on or between the teeth of or irregularly arranged in one or more whorls on the outside of the tube; cells 2, parallel or diverging, very rarely confluent; staminodes 5 or 10, co-ordinate with the stamens or 0. *Ovary* free, 4-5- (rarely 10-12-) celled or reduced to a single carpel; ovules 2-many (rarely 1) in each cell, attached to the inner angle; styles as many as the cells of the ovary, distinct or connate. *Fruit* often a 5-valved loculicidal capsule, woody, chartaceous or membranous, sometimes of 1-6 spreading or spirally twisted follicles, rarely dividing into cocci or baccate. *Seeds* sometimes arillate, occasionally winged; albumen fleshy, thin or 0; embryo straight or curved; cotyledons usually foliaceous.

Flowers unisexual; petals wanting:—

Leaves clothed beneath with peltate scales; fruit indehiscent

1. *Heritiera*.

Leaves without peltate scales; fruit follicular:—

Follicles woody or coriaceous:—

Seeds winged; follicles globose, large, woody; leaves cordate ovate,

7-nerved at the base.....2. *Pterygota*.

Seeds not winged; follicles usually coriaceous and oblong, opening when mature; leaves simple lobed or digitate.....3. **Sterculia.**

Follicles membranous, opening long before maturity; leaves palmately lobed 4. **Firmiana.**

Flowers bisexual; petals present, often deciduous:—

Staminal tube adnate to the gynophore, forming a more or less elongated stalk:—

Fruit a membranous, inflated capsule; trees with cordate 5-nerved leaves **Kleinhofia.**

Fruit of straight or spirally twisted follicles; seeds not winged; shrubs.....5. **Helicteres.**

Fruit a woody loculicidal 5-valved capsule; seeds winged; trees or shrubs, usually mealy 5. **Pterospermum.**

Staminal tube distinct from the carpels and enclosing them:—

Staminal tube elongate, bearing the stamens on its outer surface in a cone; no staminodes 7. **Eriolaena.**

Staminal tube short, divided into 5 teeth bearing the anthers; petals marcescent; no staminodes:—

Styles or stigmas, cells of ovary and valves of fruit 5 each

8. **Melochia.**

Style or stigma and cell of ovary 1 each, capsule 2-valved, 1-seeded.....9. **Waltheria.**

Staminal tube short, bearing 5 or 10 staminodes with solitary or clustered anthers between them:—

Petals deciduous:—

Trees with 10-15 fertile anthers:—

Leaves scabrid or glabrous above, pubescent beneath; anthers 15, in threes; fruit muricate, many-seeded.....10. **Guazuma.**

Leaves glabrous on both sides; anthers 10, single; fruit rugose, seed 1 11. **Leptonychia.**

Climbing shrubs or herbs with 5 fertile anthers; fruit bristly, 5-valved, valves 1-seeded.....12. **Buettneria.**

Petals persistent:—

Leaves ovate or lanceolate, obtuse; bracteoles persistent; anthers 5 13. **Melhania.**

Leaves tapering from the truncate base to the caudate tip; bracteoles caducous; anthers 15.....**Pentapetes.**

1. **Heritiera**, Ait.

Trees. *Leaves* simple, peltate-scaly beneath, penninerved or 3-nerved. *Flowers* small, 1- or 2-sexual, in axillary panicles. *Calyx* 5-toothed or 5-fid. *Petals* 0. *Staminal column* slender,

bearing in a ring beneath the apex 5-10 adnate anthers with parallel cells. *Carpels of ovary* 5-6, subdistinct, alternating at the base with pairs of staminodes; ovules 1-2 in each carpel; styles short; stigmas 5, thick. *Ripe carpels* woody, indehiscent, beaked or samaroid. *Seeds* exalbuminous; cotyledons thick, radicle next the hilum.

Leaves oblong, exceeding 5 in. long by 2 in. broad, main nerves 10 or more pairs; ripe carpels woody, keeled, with a thin narrow beak; coast tree 1. *littoralis*.

Leaves lanceolate, less than 5 in. long by 2 in. broad, main nerves about 7 pairs; ripe carpels samaroid, the wing long membranous; tree of hill forests 2. *Papilio*.

1. *HERITIERA LITTORALIS*, Dryand.; F. B. I. i. 363; W. & A. 63.

W. Coast at Cochin and perhaps elsewhere, perhaps also on E. Coast in Southern Districts.

Wood dark red, hard, heavy and tough.

2. *HERITIERA PAPILIO*, Bedd. Fl. t. 218; F. B. I. i. 363.

W. Ghâts of Tinnevely and Travancore extending northwards to Nilgiris, at 2,000 to 4,000 ft.

Wood red, very hard and tough, used in Tinnevely for building, cart poles, and agricultural implements.

2. *Pterygota*, Endl.

Trees. *Leaves* undivided. *Flowers* in panicles from the axils of fallen leaves, 1-sexual or polygamous. *Calyx* deeply 5-partite. *Petals* 0. *Staminal column* cylindric bearing 4-5 phalanges of about 5 anthers each in ♂ flowers, and staminodes round the base of the ovary in ♀ flowers. *Ovary* of 5 sessile carpels; ovules numerous; styles short, recurved; stigma 2-lobed. *Fruit* of 5 large, globose or obovoid, follicles, hard and woody, opening when ripe only with 1 valve. *Seeds* about 40, furnished with an oblong-obovate wing attached to the margin of the valve; albumen adhering to the cotyledons; radicle small, superior.

PTERYGOTA ALATA, R. Br. *Sterculia alata*, Roxb. Cor. Pl. iii. t. 287; F. B. I. i. 360. *S. Haynii*, Bedd. Fl. t. 230.

A tall evergreen tree with ovate cordate large leaves, reddish-brown flowers and a hard woody fruit 5 in. in diam. Wood white, of good quality but little used. Vern. *Mal.* Kodathani, Anathondi.

W. Gháts, in evergreen forests from Malabar to Tinnevely up to 3,000 ft.; often planted elsewhere.

3. Sterculia, Linn.

Trees. *Leaves* undivided, lobed or digitate. *Flowers* in usually axillary panicles or racemes, 1-sexual or polygamous. *Calyx* 4-5-fid or -partite. *Petals* 0. *Staminal column* bearing 10-30 anthers at its apex. *Ovary* of 5 nearly distinct carpels; ovules 2-many in each carpel; styles connate below; stigmas radiating. *Ripe carpels* distinct, follicular, sessile or stalked, woody coriaceous or membranous. *Seeds* 1-many; albumen adhering to the cotyledons.

Leaves digitate with 7-9 leaflets; calyx dull orange-coloured, deeply 5-partite, glabrous outside, thickly villous within; follicles large, woody, scarlet 1. *foetida*.

Leaves palmately lobed, velvety beneath; calyx-tube campanulate, about equal to the lobes; follicles coriaceous, villous:—

Calyx yellow, pubescent within; follicles red, covered with stinging bristles; leaves with 5 short caudate lobes 2. *urens*.

Calyx pink, glabrous within; follicles bright red, rusty villous, covered with stellate non-stinging hairs; leaves with 5-7 long-acuminate lobes 3. *villosa*.

Leaves undivided:—

Leaves palmately 7-ribbed, cordate, acuminate, glabrous; calyx-segments linear spathulate, free nearly to the base; follicles stalked, ventricose with a membranous wing 4. *populnifolia*.

Leaves penninerved:—

Lower nerves rising acutely from the base of the leaf; petioles and reticulate nervules rusty-stellate-tomentose; calyx densely tomentose, segments erect, broadly ovate; follicles obovoid, red with black seeds 5. *guttata*.

Lower nerves divaricate; petioles and blades glabrescent; calyx subglabrous, segments linear, connivent; follicles oblong with acuminate tip and rusty down, seeds black 6. *Balanghas*.

1. STERCULIA FOETIDA, Linn.; F. B. I. i. 354; W. & A. 63; Wt. Ic. t. 181.

Forests of the W. Coast at low elevations, scarce; elsewhere planted.

A large deciduous tree with light wood of little or no value.

The flowers have a very offensive smell. Vern. *Tam.* Pinári.

2. *STERCULIA URENS*, Roxb. Cor. Pl. i. t. 24; F. B. I. i. 355; W. & A. 63.

Dry forests in most Districts, especially on dry rocky hills, and associated with *Boswellia*.

A large deciduous tree, very conspicuous from its pale smooth bark which peels off in flakes. Wood soft and used only for toys. Vern. *Hind.* Gular; *Tel.* Tabsu; *Tam.* Kávalam; *Mal.* Thondi.

3. *STERCULIA VILLOSA*, Roxb.; F. B. I. i. 355; W. & A. 63; Brand. For. Fl. t. 10.

N. Circars, in Ganjam forests; Deccan in Coimbatore; W. Ghát Districts, S. Canara to Travancore.

A large deciduous tree with soft perishable wood. The bark gives a strong coarse fibre used for elephant ropes. Vern. *Hind.* Udál; *Tam.* Muratthan; *Mal.* Vakka; *Kan.* Savaya.

4. *STERCULIA POPULNIFOLIA*, Roxb.; F. B. I. i. 361; W. & A. 62.

Deccan Hills and E. Gháts, usually among rocks.

A small tree with scarlet flowers and inflated papery follicle. Vern. *Tel.* Delibuda.

5. *STERCULIA GUTTATA*, Roxb.; F. B. I. i. 355; W. & A. 62; Wt. Ic. t. 487; Bedd. Fl. t. 105.

Evergreen forests of W. Gháts up to 2,000 ft., very common; Sandur Hills in Bellary.

A moderate-sized evergreen tree with soft useless wood. Vern. *Tam.* Kávalam; *Mal.* Kithondi.

6. *STERCULIA BALANGHAS*, Linn.; F. B. I. i. 358; Wt. Ill. t. 30; W. & A. 62.

W. Gháts in Malabar, Travancore, and Tinnevely, scarce. A moderate-sized tree with soft wood. Vern. *Mal.* Kávalam.

4. *Firmiana*, Marsigli.

Trees. *Leaves* palmately lobed. *Flowers* in terminal panicles, brightly coloured. *Calyx* tubular, covered with stellate tomentum, lobes short. *Petals* 0. *Staminal column* slender, bearing about 30 sessile anthers. *Ovary* of 5 carpels; ovules 2 in each carpel; styles short, recurved; stigmas acute. *Fruit* of 5 stipitate mem-

adhering to each margin of the open follicle, ovoid, smooth; embryo transverse, radicle inferior.

FIRMIANA COLORATA, R. Br. *Sterculia colorata*, Roxb. Cor. Pl. i. t. 25; F. B. I. i. 359; W. & A. 63.

A moderate-sized deciduous tree with conspicuous scarlet flowers, palmately lobed leaves and papery follicles.

N. Circars in Vizagapatam and Godavari; Deccan forests, here and there; W. Gháts forests from S. Canara to Travancore, but not common.

Wood soft and useless. Vern. *Hind.* Bodula; *Tel.* Karaka; *Mar.* Khowsay; *Mal.* Malam paratthi.

5. *Helicteres*, Linn.

Trees or shrubs, more or less stellately pubescent. *Leaves* entire or serrate. *Flowers* axillary solitary or fascicled. *Calyx* tubular, 5-toothed at the apex, teeth often unequal. *Petals* 5, equal or unequal, with long sometimes divided claws, usually zygomorphic. *Staminal column* elongated, adnate to the gynophore, 5-toothed or -lobed; anthers 5-10, in groups at the top of the column between the teeth; cells divergent superposed sometimes confluent. *Ovary* 5-lobed, 5-celled, at the top of the column; ovules many in each cell; styles 5, subulate, more or less united. *Follicles* spirally twisted or straight. *Seeds* tubercled; albumen scanty; cotyledons folded round the radicle.

HELICTERES ISORA, Linn.; F. B. I. i. 365; W. & A. 60; Wt. Ic. t. 180.

A large shrub with obovate obliquely cordate serrate leaves, scabrous above, pubescent beneath; flowers red, fading to lead colour, 1.5 in. across, followed by spirally twisted cylindric pubescent fruit.

Forests in all Districts, common in undergrowth.

A useful shrub, giving small fuel of value and a strong but coarse fibre from its bark.

Vern. *Hind.* Marorphal; *Ur.* Ovla; *Tam.* Kaiva.

6. *Pterospermum*, Schreb.

Trees or shrubs, scaly or stellately tomentose. *Leaves* coriaceous, often oblique, penninerved. *Flowers* often very long, on short axillary 1- or few-flowered peduncles; bracteoles 3, entire

lacinate pectinate fimbriate or 0. *Calyx* tubular, 5-fid or 5-partite, deciduous. *Petals* 5, deciduous. *Staminal column* adnate to the gynophore, bearing 5 groups of 8 stamens each between the staminodes. *Ovary* within the apex of the column, 5-celled; cells many-ovuled; style entire. *Capsule* woody or leathery, ovoid or oblong, terete or angled, loculicidally 5-valved. *Seeds* ascending, winged above; albumen thin or 0; cotyledons corrugated or folded.

Reticulation of leaves raised, conspicuous:—

Calyx 1-1.5 in. long:—

Bracteoles lacinate; capsule obtusely angled, 3 in. long, acute; cells 4-seeded 1. *reticulatum*.

Bracteoles ovate or lanceolate, pectinate; capsule tuberculate, 2 in. long, furfuraceous; cells about 4-seeded 2. *obtusifolium*.

Calyx 2-2.5 in. long; bracteoles ovate, pectinate; capsule obtusely 5-angled, 2 in. long; cells 8-10-seeded 3. *Heyneanum*.

Calyx 4-5 in. long; capsule acutely 5-angled 4. *diversifolium*.

Reticulation of leaves obscure:—

Leaves cordate at the base on one side, acute on the other; capsule subclavate acutely angled 5. *rubiginosum*.

Leaves subequally rounded or subcordate at the base; capsule oblong, terete 6. *suberifolium*.

1. *PTEROSPERMUM RETICULATUM*, W. & A. 69; F. B. I. i. 369.

Evergreen forests of Malabar and Travancore at low elevations, frequently planted on roadsides.

A handsome tree with reddish-brown hard wood. Vern. *Tam.* Muli polavu; *Mal.* Mala varam.

2. *PTEROSPERMUM OBTUSIFOLIUM*, Wight; F. B. I. i. 369.

Forests of Tinnevely and Travancore, apparently scarce.

3. *PTEROSPERMUM HEYNEANUM*, Wall.; F. B. I. i. 369; W. & A. 69; Wt. Ic. t. 489.

Forests of N. Circars and Deccan from Ganjam to Cuddapah and Chingleput.

A beautiful tree, resembling *P. acerifolium*, Willd., of N. India, but with smaller leaves. The young leaves and those of shoots are often much lobed. Wood light red, hard. Vern. *Tam.* Polavu; *Tel.* Tada.

4. *PTEROSPERMUM DIVERSIFOLIUM*, Bl.; F. B. I. i. 369. *P. glabrescens*, W. & A. 69; F. B. I. i. 369.

Forests of W. Gháts at low elevations, not common.

A moderate-sized tree with horizontal branches. Wood reddish, soft. Vern. *Tam.* Vatta polavu; *Mal.* Pambaram.

5. *PTEROSPERMUM RUBIGINOSUM*, Heyne; F. B. I. i. 368; W. & A. 68; Bedd. Fl. t. 106.

Evergreen forests of the W. Gháts, up to 3,000 ft., common in Wynaad, Anamalais and Tinnevely, less so in Travancore.

A tall graceful tree, with a pink hard and close-grained wood, good but little known. Vern. *Tam.* Chittilei polavu; *Mal.* Malam thodali.

6. *PTEROSPERMUM SUBERIFOLIUM*, Lam.; F. B. I. i. 367; W. & A. 68.

Forests of N. Circars in Ganjam; Deccan in Mysore, Coimbatore, Cuddapah and N. Arcot, up to 3,000 feet; Striharikota forest on the Nellore Coast.

A moderate-sized pretty tree with light red wood, little used. Vern. *Ur.* Bailo; *Tel.* Lolagu; *Tam.* Tada.

7. *Eriolaena*, DC.

Trees. *Leaves* cordate, crenate or serrate, stellately pubescent or tomentose beneath. *Flowers* 1-many on axillary peduncles, rather large; bracteoles 3-5, multisept laciniate, sometimes small, and caducous. *Calyx* 5-fid or 5-partite. *Petals* 5, deciduous, with dilated tomentose claws; blade flat, glabrous. *Staminal column* bearing many 1-anthered filaments; anthers erect, cells parallel. *Staminodes* 0. *Ovary* sessile, 5-10-celled; cells many-ovuled. *Style* with 5-10 stigmatic lobes at the apex. *Capsule* woody, loculicidally dehiscent. *Seeds* ascending, winged above; albumen thin; cotyledons folded or contortuplicate.

Leaves membranous, very white beneath, buds oblong, constricted at the middle: bracteoles very small, distant, multifid, caducous

1. *Lushingtonii*.

Leaves chartaceous or coriaceous; buds ovoid:—

Bracteoles small, entire or lobed, caducous; stigma 5-lobed; capsule-valves not tubercled 2. *quinquelocularis*.

Bracteoles large, much divided, persistent; stigma 8-10-lobed; capsule-valves tubercled 3. *Hookeriana*.

1. *ERIOLAENA LUSHINGTONII*, Dunn in Kew Bull. 1915, 88.

Nallamalai Hills of Kurnool (A. W. Lushington).

2. *ERIOLAENA* *QUINQUELOCULARIS*, Wight under Wt. Ic. t. 882; F. B. I. i. 371; *Microchlaena quinquelocularis*, W. & A. 71.

Deccan, Sandúr Hills of Bellary, Hills of Coimbatore; W. Gháts from Mysore to Travancore at 2,000 to 4,000 ft., common.

A small tree with grey foliage.

3. *ERIOLAENA* *HOOKEIANA*, W. & A. 70; F. B. I. i. 70.

E. Gháts from Ganjam to Godavari; hill forests of the Deccan and Carnatic, up to 5,000 ft. in Cuddapah; W. Gháts, in the Pulney Hills.

A small tree with a light red, tough and strong wood. Vern. *Tel.* Naf botku.

✓ 8. *Melochia*, Linn.

Herbs, shrubs, or rarely trees, stellately pubescent. *Leaves* usually serrate. *Flowers* clustered, paniced or corymbose. *Calyx* 5-toothed or 5-fid, campanulate or inflated. *Petals* 5, spathulate or oblong, marcescent. *Stamens* 5, opposite the petals, connate at the base or beyond the middle. *Staminodes* minute or 0. *Ovary* sessile or shortly stalked with 5 2-ovuled cells; styles 5, free or united at the base. *Capsule* with 5 loculicidal valves. *Seeds* ascending, albuminous; embryo straight; cotyledons flat.

Herb with flowers in densely crowded terminal clusters...1. *corchorifolia*.
Small tree with flowers in umbellate corymbs 2. *umbellata*.

1. *MELOCHIA* *CORCHORIFOLIA*, Linn.; F. B. I. i. 374. *Riedleia corchorifolia*, W. & A. 66.

A weed of roadsides and waste places, found in most Districts.

2. *MELOCHIA* *UMBELLATA*, Stapf in Kew Bull. 1913, 317. *M. velutina*, Bedd.; F. B. I. i. 374. *Visenia umbellata*, Wt. Ic. t. 509.

Coorg, near Mercara (Hohenacker), elsewhere cultivated in gardens and doubtfully indigenous.

9. *Waltheria*, Lfap.

Herbs or undershrubs with stellate mixed with simple pubescence. *Leaves* simple, serrate; stipules narrow. *Flowers* small.

anther-cells parallel. *Ovary* sessile, 1-celled; ovules 2, ascending; style excentric; stigma club-shaped. *Fruit* a 2-valved, 1-seeded capsule. *Seed* ascending; albumen copious; embryo straight; cotyledons flat.

WALTHERIA INDICA, Linn.; F. B. I. i. 374; W. & A. 67.

An undershrub with much soft pubescence, ovate serrate leaves and small yellow flowers in globose axillary clusters. All Districts, common on roadsides, in waste places, and in forest undergrowth.

10. Guazuma, Plum.

A tree. Leaves simple, tomentose. *Flowers* in axillary cymes. *Sepals* 5, connate below. *Petals* 5, concave at the base, prolonged above into 2 narrow strap-shaped processes. *Stamens* 10, connate into a tube below, divided above into 5 3-anthered filaments alternating with 5 lanceolate staminodes. *Ovary* sessile, 5-lobed, 5-celled; styles more or less connate; ovules many in each cell. *Fruit* globular, woody, tubercled, many-seeded. *Seeds* albuminous, cotyledons folded.

GUAZUMA TOMENTOSA, Kunth.; F. B. I. i. 375; Wt. Ill. t. 31; W. & A. 64; Bedd. Fl. t. 107.

A small tree with obliquely cordate leaves and yellow flowers in large terminal and axillary panicles. Fruit 5-celled, resembling a small ripe mulberry in shape, size, and colour. An introduced tree, often found run wild, usually in the vicinity of towns and villages, indigenous in tropical America.

11. Leptonychia, Turcz.

Shrubs or trees. Leaves simple, entire. *Flowers* axillary, cymose. *Sepals* 5, valvate, distinct nearly to the base. *Petals* 5, valvate, short, orbicular, concave. *Staminal* tube short, bearing an outer series of 10-15 ligulate staminodes, a middle one of 10 fertile stamens and an inner one of 5 short fleshy staminodes. *Ovary* sessile, with 3-6 many-ovuled cells; style single, lobed at the top. *Capsule* (1-) 2-8-celled, dehiscing septically or loculicidally or both, or irregularly. *Seeds* black, with

LEPTONYCHIA MOACURROIDES, Bedd. Fl. t. 114; F. B. I. i. 379.

A small tree with lanceolate-caudate glabrous leaves and cymes shorter than the petioles; capsule tubercled.

W. Ghâts from the Carcoor Ghât in Wynaad, through Coimbatore, Tinnevely, and Travancore, up to 3,000 ft.

12. Buettneria, Linn.

Herbs, trees or shrubs, often climbing and frequently prickly. *Leaves* often glabrous. *Flowers* minute, in much-branched axillary or terminal cymes. *Sepals* 5, connate below. *Petals* 5, claws concave, limb with a long strap-shaped 2-fid appendage. *Stamens* 10, connate below, bearing 5 stamens alternating with 5 staminodes. *Ovary* sessile, with 5 2-ovuled cells; style entire or 5-fid. *Capsule* globose, spiny, with 5 1-seeded cells and 5 septicidally deciduous valves. *Seeds* axile, exalbuminous; cotyledons folded round the superior radicle.

BUETTNERIA HERBACEA, Roxb. Cor. Pl. i. t. 29; F. B. I. i. 376; W. & A. 65; Wt. Ic. t. 488.

A large unarmed herb with glabrous ovate acuminate dentate leaves and small flowers in short cymes followed by thinly bristly fruit.

N. Circars, Deccan and Carnatic, in forest undergrowth and shady places.

13. Melhania, Forsk.

Herbs, shrubs or undershrubs, with softly tomentose indumentum. *Leaves* simple, linear-oblong ovate or cordate, crenate or serrate. *Flowers* yellow, on 1-few-flowered axillary peduncles; bracteoles narrow or cordate, often longer than the calyx. *Calyx* 5-partite. *Petals* 5, withering round the growing capsule. *Stamens* 10, of which 5 are sterile, connate below into a short cup; staminodes ligulate, alternating with the perfect stamens. *Ovary* sessile, 5-celled; ovules 1-many in each cell; style short, rarely long, divided into 5 subulate spreading branches. *Capsule* loculicidally dehiscent. *Seeds* albuminous; cotyledons plicate.

Leaves velvety above; bracteoles lanceolate or ovate; shrubs:—

Cymes equal to the petiole; leaves oblong; bracteoles lanceolate

1. canning

Cymes twice as long as the petiole; leaves roundish ovate; bracteoles ovate 2. *Hamiltoniana*.
 Leaves glabrous above; bracteoles linear; undershrubs 3. *incana*.

1. MELHANIA CANNABINA, Wight; F. B. I. i. 372.

S. Carnatic, in Tinnevely at Tuticorin (Wight).

2. MELHANIA HAMILTONIANA, Wall.; F. B. I. i. 372. *M. abutiloides*, Arn.; Wt. Ic. t. 23.

E. Coast, in Kistna and Guntur, on rocky hills.

3. MELHANIA INCANA, Heyne; F. B. I. i. 372; W. & A. 68.

Deccan, in Cuddapah and Coimbatore, on red-soil lands.

Kleinhofia Hospita, L. is a showy tree often cultivated in gardens and avenues.

Pentapetes phoenicea, L., is a herbaceous annual with showy scarlet flowers, cultivated and occasionally found run wild, but not indigenous in S. India.

Theobroma Cacao, Linn., the Cacao tree, producing cocoa and chocolate, is sometimes cultivated in suitable places, as on the Malabar Coast and in Nilgiri valleys (e.g. Barliyar).

Family XXVIII. TILIACEAE.

Trees, shrubs or herbs, usually with mucilage sacs in the bark and leaves. Leaves usually alternate, simple or lobed; stipules free, usually small and deciduous, rarely persistent or 0. Flowers regular, hermaphrodite or rarely 1-sexual, usually in terminal or axillary cymes. Sepals 3-5, free or united into a campanulate calyx, usually valvate. Petals 3-5 or 0, inserted round the base of the torus, contorted imbricate or valvate. Stamens usually indefinite, inserted on an elongated or short torus; filaments free or rarely shortly connate at the base into a complete or 5-10-adelphous ring; anther-cells 2, parallel, dehiscing by lateral clefts. Ovary free, sessile on the torus, 2-10-celled; ovules 1-many, inserted on the inner angle of the cells; style entire, divided or 0; stigmas terminal on the style or branches or sessile on the ovary. Fruit (1-) 2-10-celled, or by false septa many-celled; baccate, or dry and dehiscing or separating into cocci. Seeds solitary and numerous in each cell; testa usually coriaceous or crustaceous; albumen usually copious; cotyledons ovate or cordate.

Fruit a 6-winged 3-celled capsule; tree with rather large ovate acuminate leaves and flowers in large terminal panicles **Berrya.**

Fruit a 2-4-parted or -lobed or entire unarmed drupe containing 1 or several pyrenes; usually trees or erect shrubs.....1. **Grewia.**

Fruit a prickly or bristly capsule; herbs or undershrubs

2. **Triumfetta.**

Fruit a siliquose or globose unarmed capsule; annuals or prostrate perennials 3. **Corchorus.**

1. **Grewia**, Linn.

Trees or erect straggling or climbing shrubs, usually stellately pubescent. *Leaves* 3-7-ribbed. *Flowers* usually yellow, in axillary, extra-axillary or terminal cymes, fascicles or panicles. *Sepals* 5, distinct. *Petals* 5, usually with a gland at the base within, generally shorter than the sepals, inserted round the base of the torus, very rarely 0. *Stamens* numerous, inserted on a short or elongated often glandular torus. *Ovary* of 2-4, 2-many-ovuled cells; style subulate; stigma short, 2-5-lobed or lacinate. *Fruit* 1-4-pyrened, entire or 2-4-lobed; pyrenes 1- or 2-many-seeded and spuriously septate between the seeds. *Seeds* ascending or horizontal; albumen copious, fleshy or rarely scanty; cotyledons flat, foliaceous or fleshy.

Inflorescence paniculate; fruit unlobed, pyriform; leaves ovate or obovate-lanceolate, acuminate; trees (Subgenus i. **Microcos**)

1. **Microcos.**

Inflorescence not paniculate, axillary or extra-axillary (Subgenus ii. **Eugrewia**):—

Peduncles 1-2-flowered, capillary, extra-axillary; leaves roundish, glabrous or subglabrous; fruit small, 2-parted, usually with 4 storages (Series 1. **POPULIFOLIAE**) 2. **betulaefolia.**

Peduncles many-flowered:—

Leaves 3-ribbed, ovate to lanceolate; flowering peduncles much longer than the petioles (except in *G. obtusa*, *G. orientalis*, and *G. Barberi*):—

Leaves glabrous or with spreading pubescence, or spreading tomentum:—

Fruit unlobed, depressed-globose, .6-1 in. across, velvety until old; leaves very finely regularly crenate, glabrous or subglabrous or subscabrous (Series 2. **ALYSICARPAE**):—

Peduncles shorter than the petioles; leaves lanceolate; fruit .8-1 in. across 3. **obtusa.**

Peduncles longer than the petioles; leaves oblong to ovate; fruit .6-.7 in. across:—

Leaves ovate; peduncles arcuate; tomentum of fruit matted 4. *ramnifolia*.

Leaves oblong; peduncles straight; tomentum of fruit spreading 5. *Wightiana*.

Fruit slightly or deeply divided into 4 equal lobes; gonophore manifest; peduncles stout, extra-axillary, solitary or in pairs, never fascicled; leaves often scabrous above, margins crenate or crenate-dentate (Series 3. COLUMNARES).

Lobes of fruit large, .4 in. long or more, distinct:—

Buds .25 in. across; pedicels few together; leaves densely pubescent beneath:—

Gonophore .25 in. long:—

Twigs and leaves beneath softly tomentose...6. *Gamblei*.

Twigs and leaves beneath harshly tomentose

7. *Lawsoniana*.

Gonophore .4 in. long; leaves softly pubescent beneath

8. *heterotricha*.

Buds .12 in. across; pedicels very numerous; leaves subglabrous 9. *umbellifera*.

Lobes of fruit small, .3 in. long or less, more or less united; leaves ovate, obtuse, scabrous above:—

Peduncles equal to or not more than twice as long as the petioles; leaves glabrous beneath; fruit slightly 4-lobed, shortly bristly.....10. *orientalis*.

Peduncles 3-6 times longer than the petioles; leaves with soft spreading tomentum beneath; fruit deeply 4-lobed, covered at maturity with long soft hairs ...11. *emarginata*.

Fruit normally deeply divided into 2 oval or emarginate lobes; leaves usually glabrous, apex sharply acuminate, margin sharply serrate (Section 4. SERRULATAE):—

Peduncles usually 3 times longer than the petioles; twigs usually glabrous; leaves ovate-lanceolate 12. *disperma*.

Peduncles about equal to the petioles; twigs usually pubescent; leaves linear- to ovate-lanceolate:—

Pedicels thickened upwards 13. *Barberi*.

Pedicels capillary 14. *lanceaefolia*.

Leaves finely densely appressed tomentose beneath (Section 5. BICOLORES):—

Fruiting pedicels and peduncles long and slender; fruit unlobed, pisiform; leaf conspicuously serrate up to the acuminate tip

15. *Rothii*.

Fruiting pedicels and peduncles short and stout; fruit 2-parted; leaf very finely serrate up to the obtuse tip

16. *Damine*.

Leaves 5-ribbed, ovate or orbicular; peduncles axillary much longer than the petioles (or if, as in *G. tiliaefolia*, shorter, then stipules strongly sagittate); fruit didymous, bilobed or unlobed (Series 6. *TILIAEFOLIAE*):—

Peduncles shorter than the petioles; leaves and fruit usually glabrous at maturity; buds tomentose 17. *tiliaefolia*.

Peduncles longer than the petioles:—

Leaves finely grey-tomentose beneath, minutely irregularly serrate; fruit tomentose, slightly 2-lobed 18. *rotundifolia*.

Leaves pubescent beneath:—

Leaves obtuse or shortly acuminate; stipules auriculate; prostrate shrubs:—

Leaves cordate or truncate at the base, somewhat parallel-sided, finely regularly crenate; fruit unlobed, tomentose 19. *subinaequalis*.

Leaves obtusely cuneate or rounded at the base, elliptic, irregularly coarsely crenate 20. *sapida*.

Leaves caudate; stipules lanceolate; trees 21. *pandaica*.

Leaves 3- or 5-ribbed; peduncles shorter or only slightly longer than the petioles:—

Leaves 5-ribbed, roundish:—

Leaves rounded at top, cordate, with raised concentric reticulation, velvety-pubescent below (Series 7. *GLOMERATAE*)

22. *villosa*.

Leaves usually irregularly lobed at the top, deeply bidentate, scabrous; fruit slightly 4-lobed (Series 8. *ASPERAE*) ... 23. *aspera*.

Leaves 3-5-ribbed, linear oblong:—

Buds oval; sepals 2-3 in. long; ovules less than 8 (Series 9. *HIRSUTAE*):—

Leaves 4-5-ribbed and a little oblique at the base; fruit slightly lobed, epicarp hairy until old, breaking away from the stones

24. *hirsuta*.

Leaves 3-ribbed, equal at the base; fruit distinctly lobed, at length glabrous 25. *polygama*.

Buds cylindric; sepals 5-6 in. long; ovules 12-20; fruit slightly 1-4-lobed; pericarp stellately scabrous, breaking away from the fibrous interior (Series 10. *CARPINIFOLIAE*) 26. *flavescens*.

W. Gháts, from S. Canara and Mysore to Travancore and Tinnevelly.

An erect shrub, at once distinguished by its paniculate inflorescence and unlobed fruit; flowers white.

2. GREWIA BETULAEFOLIA, Juss. *G. populifolia*, Vahl; F. B. I. i. 385; W. & A. 80.

Deccan and Carnatic, common in hot dry localities.

A small much-branched shrub with small round leaves and yellowish edible fruit.

3. GREWIA OBTUSA, Wall. *G. bracteata*, W. & A. 76; F. B. I. i. 389 partly (*not of Roth*). •

Deccan and Carnatic, from Kurnool to Madura, up to 4,000 ft.; E. slopes of Nilgiris, at 5,000 ft.

A shrub with lanceolate leaves, 3-4 in. long.

4. GREWIA RHAMNIFOLIA, Heyne. *G. orientalis*, W. & A. 76; F. B. I. i. 384 (*not of Linn.*).

N. Circars and Carnatic Districts, extending to the E. Deccan.

A straggling or somewhat scandent shrub.

5. GREWIA WIGHTIANA, J. R. Drumm. *G. bracteata*, Mast. F. B. I. i. 389 (*not of Roth*).

Tinnevelly District, at Karyar (Barber). •

6. GREWIA GAMBLEI, J. R. Drumm.

W. Gháts, in Nilgiris and Wynad, at 3,000 to 6,000 ft.

7. GREWIA LAWSONIANA, J. R. Drumm.

W. Gháts, from Mysore through Malabar to Travancore.

8. GREWIA HETEROTRICHA, Mast. F. B. I. i. 385.

W. Gháts, in S. Canara, Coorg, Coimbatore and Nilgiris Districts, at 3,000 to 6,000 ft. •

A climbing shrub.

9. GREWIA UMBELLIFERA, Bedd.; F. B. I. i. 393.

W. Gháts, in all the Districts.

10. GREWIA ORIENTALIS, Linn.; *G. columnaris* Sm.; F. B. I. i. 383; Wt. Ic. t. 44; W. & A. 76.

Carnatic, from Chingleput to Tinnevelly and lower Travancore.

A straggling shrub.

11. GREWIA EMARGINATA, W. & A. 79; F. B. I. i. 384.

W. Gháts, from Mysore southwards to the Malabar coast.

12. GREWIA DISPERMA, Rottl. *G. laevigata*, Vahl; W. & A. 77; F. B. I. i. 389.

In all Districts, in scrub forests, hedgerows, etc.

A small or middle-sized tree with 1-2-lobed drupe, each lobe with 2 nuts.

13. GREWIA BARBERI, J. R. Drumm.

Deccan, in Mysore, Bellary and Coimbatore; W. Gháts, from S. Canara to N. and E. slopes of Nilgiris, up to 5,000 ft.

14. GREWIA LANCEAEFOLIA, Roxb. *G. diplocarpa*, Thw.; F. B. I. i. 390.

W. Gháts, from Coimbatore to Tinnevely and Travancore.

15. GREWIA ROTHII, DC. *G. excelsa*, Mast.; F. B. I. i. 385 (partly, not of Vahl.).

N. Circars from Ganjam to Godavari; Deccan, in Kistna, Kurnool and Bellary.

16. GREWIA DAMINE, Gaertn. *G. salvifolia*, Heyne; F. B. I. i. 386 (partly).

N. Circars, in Vizagapatam; Deccan, Kistna to Bellary.

A shrub or small tree with small leaves, very grey-pubescent beneath.

17. GREWIA TRIANGULAEFOLIA, Vahl; F. B. I. i. 386 (partly); W. & A. 80; Bedd. Fl. t. 108.

In all forest Districts, up to about 4,000 ft.

A medium-sized tree, usually with large leaves; wood brown, strong and flexible, used for shafts of carts, oars, and other implements. Vern. *Hind.* Phalsa, Dhamin; *Ur.* Dhamono; *Tel.* Charachi; *Tam.* Únú; *Mal.* Chaidicha.

18. GREWIA ROTUNDIFOLIA, Juss.; W. & A. 80; Wt. Ic. t. 45. *G. orbiculata*, Rottl.; F. B. I. i. 386.

N. Circars in Vizagapatam and Kistna; Deccan in Kurnool and Cuddapah; Carnatic, in S. Arcot and Tinnevely.

A small tree with leaves very grey-tomentose beneath.

19. GREWIA SUBINAEQUALIS, DC. *G. asiatica*, Mast. F. B. I. i. 386 (partly).

N. Circars, in Vizagapatam, summit of Karaka Konda, 2,000 ft. (Barber).

A small shrub of forest grass-lands, behaving in similar

20. GREWIA SAPIDA, Roxb. ; F. B. I. i. 387.

N. Circars, in Ganjam.

A small shrub of forest grass-lands, usually burnt or dying down yearly and then sending up fresh shoots from a permanent root-stock.

21. GREWIA PANDAICA, J. R. Drumm.

Tinnevely District, at Kanni Katti (Barber).

A tree reaching 60 ft. in height and 14 in. in diam. of trunk.

22. GREWIA VILLOSA, Willd ; F. B. I. i. 388 ; W. & A. 79.

Deccan and Carnatic, dry forest scrub from the Kistna southwards.

A shrub with well-marked, 5-ribbed velvety leaves and crustaceous fruit.

23. GREWIA ASPERA, Roxb. *G. abutilifolia*, Mast. in F. B. I. i. 390.

N. Circars, Deccan and Carnatic, in hilly regions, and up to 3,000 ft.

A shrub with often large leaves.

24. GREWIA HIRSUTA, Vahl ; W. & A. 78 ; Wt. Ic. t. 76 ; F. B. I. i. 391.

N. Circars, Deccan and Carnatic, in all forest Districts.

A common forest undershrub with narrow leaves.

25. GREWIA POLYGAMA, Roxb. ; F. B. I. i. 391.

N. Circars, in Ganjam and Godavari.

A forest shrub or small tree.

26. GREWIA FLAVESCENS, Juss. *G. carpinifolia*, Mast. in F. B. I. i. 387 (not of Juss.). *G. pilosa*, W. & A. 78.

N. Circars, Deccan and Carnatic, in most forest Districts.

A small tree.

2. Triumfetta, Linn.

Herbs or undershrubs with stellate pubescence. *Leaves* serrate dentate or entire, sometimes 3-5-lobed. *Flowers* yellow, axillary or leaf-opposed, few or densely cymose. *Sepals* 5, distinct, frequently mucronate at the apex. *Petals* 5 (rarely 0), glandular, thickened or foveolate at the base, inserted round the base of the torus. *Stamens* indefinite or rarely 10, inserted on the glandular torus, free. *Ovary* 5-celled ; cells 2-ovuled ; style filiform ;

indehiscent or separating into cocci. *Seeds* 1-2 in each cell, pendulous, albuminous; embryo straight; cotyledons flat, foliaceous.

Fruit including bristles 1 in. across, hirsute; leaves ovate-acuminate serrate, softly tomentose beneath; perennial herb 1. *pilosa*.

Fruit including bristles .5 in. across, glabrous; leaves ovate-caudate, serrate, glabrous; annual herb.....2. *annua*.

Fruit including bristles .2-.25 in. across; pericarp tomentose:—

Fruit ovoid; bristles ciliate down one side; stamens 5-13; leaves subglabrous, irregularly bluntly dentate; lower ones ovate 3-lobed; annual herb 3. *pentandra*.

Fruit globose; leaves tomentose beneath; herbaceous undershrubs:—

Lower leaves 3-5-lobed; bristles of fruit glabrous; stamens 8-15

4. *rhomboidea*.

Lower leaves orbicular; bristles of fruit puberulous; stamens 15-25

5. *rotundifolia*.

1. TRIUMFETTA PILOSA, Roth; F. B. I. i. 394; W. & A. 74.

In almost all Districts, up to 6,500 ft. in Nilgiris.

2. TRIUMFETTA ANNUA, Linn.; F. B. I. i. 396.

Deccan, in Godavari and Bellary; W. Gháts, in S. Canara and Coorg.

3. TRIUMFETTA PENTANDRA, A. Rich. *T. neglecta*, W. & A. 75; F. B. I. i. 396.

E. Coast in Guñtur; Tinnevely.

4. TRIUMFETTA RHOMBOIDEA, Jacq.; F. B. I. i. 395. *T. angulata*, Lam.; W. & A. 74; Wt. Ic. t. 320.

In almost all Districts.

5. TRIUMFETTA ROTUNDIFOLIA, Lam.; F. B. I. i. 395; W. & A. 75.

In all Districts of the Circars, Deccan and Carnatic.

3. Corchorus, Linn.

Herbs or undershrubs. *Leaves* serrate, lower pair of teeth usually prolonged into hairs. *Flowers* small, yellow; peduncles very short, axillary or leaf-opposed, 1-flowered, bracteate. *Sepals* 4-5, *Petals* 4-5, naked at the base. *Stamens* numerous (or 8-10), inserted on a very short torus. *Ovary* 2-5-celled; ovules many in each cell; style short, the apex stigmatose. *Capula* ciliiform and even, or sublobate and ciliate.

muricate, loculicidally 2-5-valved, rarely transversely septate between the seeds. *Seeds* numerous, pendulous or horizontal, albuminous, embryo curved.

Woody prostrate undershrub; leaves roundish; capsule .5-1.2 in. long, glabrous, cylindric, 4-valved; beak entire 1. *Antichorus*. Erect annuals or rarely becoming perennial and woody but then always with pubescent capsules; leaves ovate-lanceolate to oblong-lanceolate:—

Capsule elongated; valves thin:—

Capsule ending in 3 radiating points, 3-4-valved, 1-1.5 in. long:—

Capsule 6-angled, 3-winged; leaves straight-sided, serrate

2. *acutangulus*.

Capsule cylindric, not winged; leaves ovate, crenate-serrate

3. *tridens*.

Capsule ending in a single beak, lobed at the summit:—

Capsule .5 in. long, cylindric, pubescent, 3-valved; leaves straight-sided, serrate 4. *fascicularis*.

Capsule 1-3 in. long, ribbed or angled, glabrous or scabrid:—

Capsule 10-ribbed, 5-valved, glabrous; leaves ovate-lanceolate, finely crenate serrate 5. *olitorius*.

Capsule 3-4-angled, 3-4-valved, more or less pubescent:—

Capsule 1.5-3 in. long; leaves straight-sided, crenate serrate

6. *trilocularis*.

Capsule under 1 in. long; leaves ovate, serrate

7. *urticaefolius*.

Capsule depressed globose, ridged and muricate, 5-valved; valves woody; leaves straight-sided, serrate 8. *capsularis*.

1. CORCHORUS ANTICHORUS, Raeusch.; F. B. I. i. 398. *C. humilis*, Munro; Wt. Ic. t. 1073.

Deccan red soils, Cuddapah District.

2. CORCHORUS ACUTANGULUS, Lam.; F. B. I. i. 398; W. & A. 73; Wt. Ic. t. 739.

Pastures and cultivated land by the sides of ditches in most Districts of the Deccan, Carnatic and W. Coast.

3. CORCHORUS TRIDENS, Linn.; F. B. I. i. 398; W. & A. 73.

Dry Districts of the Deccan and Carnatic, on roadsides and waste lands.

4. CORCHORUS FASCICULARIS, Lam.; F. B. I. i. 398; W. & A. 72.

Most Districts of the Circars and Carnatic from Godavari to

5. *CORCHORUS OLITORIUS*, Linn.; F. B. I. i. 397; W. & A. 78.

Found run wild in many Districts, but probably not indigenous in S. India. Jute.

6. *CORCHORUS TRILOCULARIS*, Linn.; F. B. I. i. 397; W. & A. 72.

Dry Districts of the Deccan and Carnatic, a weed of waste places, roadsides, etc.

7. *CORCHORUS URTICAEFOLIUS*, W. & A. 73; F. B. I. i. 397.

Dry Districts of the Carnatic, Salem, Chingleput.

8. *CORCHORUS CAPSULARIS*, Linn.; F. B. I. i. 397; W. & A. 73; Wt. Ic. t. 312.

Found run wild occasionally, but not indigenous, less common than *C. olitorius*. Jute.

Berrya Ammonilla, Roxb.; F. B. I. i. 383; W. & A. 86; Bedd. Fl. t. 58 is the Trincomali wood tree of Ceylon, frequently cultivated in Madras and elsewhere, but not yet found wild in S. India.

Family XXIX. ELAEOCARPACEAE.

Trees or shrubs without mucilage sacs. *Leaves* entire, alternate or verticillate; stipules present, persistent or caducous. *Flowers* usually hermaphrodite, in axillary racemes, regular. *Sepals* 4-6, valvate. *Petals* 4-6, free, valvate, laciniate or rarely entire, inserted outside the disk. *Stamens* indefinite, inserted on the cushion-like disk; anthers linear, opening by terminal pores. *Ovary* sessile, 2-5-celled, ovules 2 or more in each cell, usually pendulous; style columnar. *Fruit* a drupe with a bony usually 3-5- sometimes 1-celled stone. *Seeds* pendulous, 1 to each cell, albumen fleshy, cotyledons flat.

Elaeocarpus, Linn.

Trees. *Leaves* simple, usually crenate or serrate, sometimes entire. *Flowers* hermaphrodite, rarely polygamous, in axillary or lateral racemes. *Sepals* 4-5, valvate (rarely imbricate), distinct. *Petals* 4-5, laciniate lobed or rarely entire, inserted round the base of a thickened glandular disk. *Stamens* numerous, rarely 8-12, inserted between the glands on the disk; anthers linear, dehiscing by a transverse valve at the top. *Ovary* 2-5-celled; ovules 2 in each cell; style subulate, entire. *Drupe* with a single bony tuberculate stone divided into 1-5 1-seeded cells. *Seeds* pendulous;

Flowers small; sepals under .3 in. long; anthers not awned; ovary 3-celled:—

Anthers more or less ciliate on the longer valve:—

Leaves elliptic or elliptic-obovate, chartaceous, glabrous above, slightly pubescent beneath, crenate-serrate, 2–4 in. long, petiole .5–1 in. long 1. *serratus*.

Leaves lanceolate, acuminate, chartaceous, glabrous, glandular beneath, much narrowed at base, serrulate, 3–6 in. long, petiole 5 in. long 2. *lanceaefolius*.

Leaves ovate-lanceolate, acuminate, subcoriaceous, glabrous, obtuse at base, mucronulate-serrate, 4–6 in. long, petiole 1 in. long

2. *lucidus*.

Anthers not ciliate on the longer valve; leaves broadly elliptic, coriaceous, glabrous, glandular beneath, serrate, 4–6 in. long, petiole about 1 in. long 4. *oblongus*.

Flowers medium-sized; sepals .3–.7 in. long; anthers awned with a long bristle; ovary 2–3-celled:—

Sepals ordinarily .4 in. long; leaves chartaceous, ovate or ovate-lanceolate, bluntly long-acuminate at apex, rounded at base, glabrous, 2–4 in. long; petiole slender .75–1.25 in. long; drupe shining, .5 in. long 5. *Munroii*.

Sepals ordinarily .5 in. long; leaves coriaceous, the 2 halves bent back so as to be boat-shaped, acute at apex, densely softly ferrugineous-pubescent beneath, 3–5 in. long; petiole stout, about 1 in. long; drupe shining, .7 in. long 6. *ferrugineus*.

Sepals ordinarily .6 in. long; leaves subcoriaceous, flat, obovate, obtuse at apex, base rounded, ferrugineous-pubescent beneath, especially on the midrib and nerves, 4–8 in. long; petiole stout, .5–2 in. long; drupe smooth, 1.5–2 in. long 7. *tuberculatus*.

Flowers large; sepals .7–1 in. long; anthers mucronate; ovary 2-celled; leaves coriaceous, elliptic or obovate, glandular beneath, glabrous, 3–4.5 in. long; petiole .5–.75 in. long; drupe 2 in. long

8. *venustus*.

1. ELAEOCARPUS SERRATUS, Linn.; F. B. I. i. 401; W. & A. 82.
E. cuneatus, Wt. Ill. i: 83; F. B. I. i. 402.

W. Gháts, in all Districts, in evergreen forests up to 5,000 ft.

A rather small tree with greyish-white wood and edible fruit. Vern. *Tam.* Ulang Karei; *Mal.* Nalla kara, Valiya kara.

2. ELAEOCARPUS LANCEAEFOLIUS, Roxb.; F. B. I. i. 402; Wt. Ic.

E. Gháts, in the Madgol Hills of Vizagapatam, 3,000 ft. (A. W. Lushington).

A large tree with a soft light brown wood.

3. *ELAEOCARPUS LUCIDUS*, Roxb.; F. B. I. i. 403.

E. Gháts, in the Madgol Hills of Vizagapatam, 3,000 ft. (A. W. Lushington).

4. *ELAEOCARPUS OBLONGUS*, Gaertn.; W. & A. 82; F. B. I. i. 403; Wt. Ic. t. 46.

W. Gháts, in all Districts, in evergreen forests up to 6,000 ft.; common in Nilgiri Sholas.

A large tree with whitish wood. The leaves turn red when old. Vern. *Tam.* Bikki; *Mal.* Katta kara.

5. *ELAEOCARPUS MUNROII*, Mast. in F. B. I. i. 407. *Monocera Munroii*, Wt. Ill. i. 84; Ic. t. 952.

W. Gháts, in all Districts from 2,500 to 6,000 ft.; common in Nilgiri Sholas.

A large tree with white or brown moderately hard wood.

A very pretty tree and easily recognized. In young plants and coppice shoots the leaves are often linear-lanceolate.

Vern. *Tam.* Narebikki; *Mal.* Pungári.

6. *ELAEOCARPUS FERRUGINEUS*, Wight; F. B. I. i. 406; Bedd. Fl. t. 112. *Monocera ferruginea*, Wt. Ic. t. 205.

W. Gháts, in the Nilgiris, Anamalais, Pulneys, and the higher hills of Travancore at 6,000 to 7,000 ft.

The characteristic of the curiously folded-back leaves makes this interesting tree easily recognizable.

7. *ELAEOCARPUS TUBERCULATUS*, Roxb.; F. B. I. i. 404; Bedd. Fl. t. 113. *Monocera tuberculata*, W. & A. 83; Wt. Ic. t. 62; Wt. Ill. i. t. 35.

W. Gháts, in all Districts up to 5,000 ft., on river banks and in evergreen forests.

A large tree with grey and white mottled bark and brown wood streaked with darker colour. The rugose seeds are used to make necklace beads. Vern. *Tam.* Rutthracham; *Mal.* Piláhi, Naggara.

8. *ELAEOCARPUS VENUSTUS*, Bedd. Fl. t. 174. *Elaeocarpus Monocera*, Mast. in F. B. I. i. 405 (not of Cav.).

W. Gháts, in South Travancore at 3,500 to 4,500 ft.

A large handsome tree, very ornamental with its white flowers, but scarce and little known. The leaves have

Family XXX. LINACEAE.

Herbs, shrubs or rarely trees. *Leaves* alternate, simple, usually entire; stipules lateral, intrapetiolar or 0. *Flowers* regular, bisexual, often 2- or more-morphic. *Sepals* 5 (or 4), free or connate at the base, imbricate. *Petals* 5 (or 4), hypogynous (or slightly perigynous), imbricate, often contorted, usually fugacious. *Stamens* 1-2 (-3)-times as many as the petals, with occasionally interposed staminodes, united at the base into a ring or short tube; filaments usually filiform, inserted on or near the apex of the tube; anthers versatile. *Disk* 0 or of 5 entire or didymous glands, adnate to the staminal tube. *Ovary* free, entire, 3-5-celled; ovules 1-2 in each cell; pendulous; styles 3-5, free or connate; stigmas usually terminal. *Fruit* a septicidal capsule, splitting into as many valves as or by false dissepiments into twice as many as the cells of the ovary, or a drupe. *Seeds* with fleshy or no albumen.

Erect annuals 1. **Linum.**

Shrubs or trees:—

Shrubs climbing by spiral hooks or straggling; twigs tomentose; petals imbricate; drupe globose 2. **Hugonia.**

Erect shrubs or trees; twigs glabrous; petals contorted:—

Stipules minute, subulate; flowers over 1 in. across; capsule globose, many-seeded 3. **Reinwardtia.**

Stipules short, intrapetiolar, semi-amplexicaul; flowers 3 in. across; drupe oblong, 1-seeded 4. **Erythroxylon.**

1. Linum, Linn.

Herbs or rarely undershrubs. *Leaves* alternate, narrow, entire; stipules 0 or glanduliform. *Sepals* 5, entire. *Petals* 5, contorted, fugacious. *Stamens* 5, connate at the base, often alternating with minute staminodes; glands 5, small, adnate to the outside of the staminal tube. *Ovary* 5-celled, cells imperfectly septate, 2-seeded, or by false dissepiments completely divided each into 2 1-seeded cells. *Seeds* compressed; albumen small.

LINUM MYSORENSE, Heyne; F. B. I. i. 411; W. & A. 134.

A slender erect annual with small yellow flowers and short linear leaves.

Hilly regions in the Deccan and W. Gháts at high elevations.

Linum usitatissimum, L., the Flax Plant, is often cultivated for

its oil-seeds. It has large blue flowers, and is occasionally found run wild.

2. *Hugonia*, Linn.

Scandent or straggling herbs. *Leaves* stipulate. *Flowers* yellow, the lowest 2 peduncles of each branch often turned into spiral hooks. *Sepals* 5. *Petals* 5, contorted, fugacious. *Stamens* 10, connate into a short tube at the base, and there marked by 5 glandular swellings. *Ovary* 5-celled with 2 collateral ovules in each cell; styles 5, filiform. *Drupe* globose, fleshy. *Seeds* compressed, alburninous; cotyledons flat.

HUGONIA MYSTAX, Linn.; F. B. I. i. 413; W. & A. 72; Wt. III. i. 79, t. 32.

A rambling or ~~climbing~~ shrub with tomentose twigs, elliptic-obovate glabrous leaves, and large yellow flowers, usually many together at the ends of the branches.

In almost all Districts in dry forests.

Bark yellowish, corky. Wood hard and close-grained. Vern. Tam. Motira kanni.

3. *Reinwardtia*, Dumort.

Undershrubs. *Leaves* membranous, usually serrate; stipules minute caducous. *Flowers* large, yellow or white, in short axillary racemes or in terminal corymbs; pedicels bracteate. *Sepals* 5. *Petals* 5, contorted, fugacious. *Stamens* 5, connate at the base, alternating with setiform staminodes. *Glands* 2-3, adnate to the staminal tube. *Ovary* of 3-5 2-locellate cells; ovule 1 in each locellus; styles 3-4 (-7), filiform. *Capsule* globose, 6-8-valved. *Seeds* reniform; albumen thin.

REINWARDTIA TRIGYNA, Planch.; F. B. I. i. 412. *R. tetragyna*, Planch.; F. B. I. i. 412. *Linum trigynum*, Roxb.; W. & A. 134.

A small shrub with elliptic-lanceolate acute glabrous leaves and handsome yellow flowers, with many sexual forms combining styles and stamens of varying number and length. W. Ghát forests of S. Canara and Mysore.

4. *Erythroxylon*, Linn.

Shrubs or trees, usually glabrous. *Leaves* alternate, entire, often nearly distichous; stipules intrapetiolar, on the arrested shoots imbricating. *Flowers* axillary, small, whitish, solitary or

on the inner side. *Stamens* 10-12, monadelphous. *Ovary* 3-4-celled; styles 3-4, united into a style with capitate stigmas; ovules 1-2 in each cell. *Drupe* 1-celled, 1-seeded. *Seed* with a thin testa, and little or no albumen.

Leaves obovate, obtuse, under 2 in. long 1. *monogynum*.

Leaves linear-elliptic, chartaceous 2. *lanceolatum*.

Leaves lanceolate, caudate-acuminate, membranous 3. *acuminatum*.

Leaves ovate, obtusely acuminate, coriaceous 4. *obtusifolium*.

1. *ERYTHROXYLON MONOGYNUM*, Roxb. Cor. Pl. i. t. 88; F. B. I. i. 414. *E. indicum*, Bedd. Fl. t. 81. *Sethia indica*, DC.; W. & A. 106; Wt. Ill. t. 48.

N. Circars, Deccan and Carnatic, in dry evergreen forests;

W. Gháts, in dry hill forests of Travancore, up to 3,000 ft.

A small tree with a dark brown rough bark and very hard reddish-brown wood, useful for turning and a good fuel. Vern.

Tam. Devadara; *Tel.* Adivi gerenta; *Kan.* Devadaram.

2. *ERYTHROXYLON LANCEOLATUM*, Hook. f.; F. B. I. i. 415. *Sethia lanceolata*, Wt. Ill. i. 136. *S. erythroxylodes*, Wt. Ill. i. 136.

W. Gháts, in the Hills of Tinnevely, at Courtallum (Wight).

3. *ERYTHROXYLON ACUMINATUM*, Walp. *E. lucidum*, Moon; F. B. I. i. 415. *Sethia acuminata*, Arn.; Wt. Ill. i. 135.

W. Gháts, in Wynad (Beddome) and Pulney Hills (Bourne).

4. *ERYTHROXYLON OBTUSIFOLIUM*, Hook. f.; F. B. I. i. 415. *Sethia lanceolata*, var. *obtusifolia*, Wt. Ill. i. 136.

W. Gháts, S. Canara to Nilgiris, up to 4,000 ft., scarce.

Family XXXI. MALPIGHIACEAE.

Trees or erect or climbing shrubs. *Leaves* usually opposite and entire, often provided with glands on the petiole, on the base of the blade and on the margin; stipules small or 0. *Flowers* bisexual, often irregular; pedicels jointed, bracteate. *Sepals* usually 5, imbricate, one or more usually furnished with large glands. *Petals* 5, usually equal, fimbriate or dentate, often clawed. *Disk* small. *Stamens* usually 10, 1 or more sometimes much longer than the others; filaments free or connate at the base. *Ovary* of 3 1-ovuled cells; styles 1-3. *Fruit* of 1 or more winged samaras, rarely a drupe. *Seeds* exalbuminous, embryo straight or

Calycine gland single, large; styles 1-2; samaras terminated by 1-3 lanceolate wings 1. **Hiptage**.
 Calycine glands 0; styles 3; samaras surrounded by an orbicular or lanceolate wing 2. **Aspidopterys**.

1. **Hiptage**, Gaertn.

Climbing shrubs or rarely small trees. *Leaves* opposite, coriaceous, entire, eglandular, exstipulate. *Racemes* terminal and axillary; peduncles bracteate articulated with the 2-bracteate pedicels. *Flowers* with 4 white, one coloured petal, fragrant. *Calyx* 5-partite with one large gland partly on the pedicel. *Petals* clawed, unequal, silky. *Stamens* 10, declinate, one much longer than the others; filaments connate at the base. *Ovary* 3-lobed; styles 1-2, at first circinate; stigma capitate. *Fruit* of 1-3 2-3-winged samaras. *Seeds* globose, cotyledons unequal.

Leaves 4-9 in. long; flowers 7-1 in. across; wings of samaras about 1.5 in. long 1. *Madablota*.

Leaves about 3 in. long; flowers .5 in. across; wings of samaras about 1 in. long.....2. *parvifolia*.

1. HIPTAGE MADABLOTA, Gaertn.; F. B. I. i. 418; W. & A. 107.
Gaertnera racemosa, Roxb. Cor. Pl. i. t. 18.

N. Circar, Deccan and Carnatic, chiefly in ravines in hill forests, up to 6,000 ft.

A large straggling climbing shrub with pretty flowers and rough reddish wood. Vern. *Ur*. Boromali.

2. HIPTAGE PARVIFOLIA, W. & A. 107; F. B. I. i. 419.

W. Deccan, from Mysore, Tinnevely and S. Travancore.

A climbing shrub, smaller than *H. Madablota*.

2. **Aspidopterys**, A. Juss.

Climbing shrubs. *Leaves* entire, eglandular, exstipulate. *Flowers* paniced or fascicled; peduncles bracteate; pedicels slender. *Sepals* 5, short, eglandular. *Petals* 5, clawed, entire, white or yellow, inodorous. *Stamens* 10; filaments free or connate at the base; anthers ovate. *Ovary* 3-lobed; styles 3. *Fruit* of 1-3 samaras surrounded by a shield-like membranous wing. *Seeds* oblong; cotyledons straight, equal.

Leaves orbicular, suddenly acuminate, deeply cordate, white tomentose beneath; samara wings oval 1. *cordata*.

Leaves ovate to lanceolate, acute to subcordate at the base, subglabrous beneath:—

Flowers in large panicles; samara wings elliptic.....2. *Roxburghiana*.

Flowers in axillary fascicles; samara wings orbicular ...3. *canarensis*.

1. *ASPIDOPTERYS CORDATA*, A. Juss.; F. B. I. i. 421.

Deccan, in Kurnool, Bellary and Mysore.

2. *ASPIDOPTERYS ROXBURGHIANA*, A. Juss.; F. B. I. i. 420.

Triopteris indica, Roxb. Cor. Pl. ii. t. 160.

N. Circars, in hill country; Deccan, Nallamalai Hills of Kurnool, Sandúr Hills of Bellary, etc.

3. *ASPIDOPTERYS CANARENSIS*, Dalz.; F. B. I. i. 420. *A. glomerata*, Wt. Ic. t. 1986.

Deccan, in Mysore; W. Gháts, Malabar to Tinnevely.

Family XXXII. ZYGOPHYLLACEAE.

Herbs or shrubs or rarely trees. *Leaves* opposite or (by the suppression of one of the pair) alternate, stipulate, 2-3-foliolate or pinnate; leaflets entire; stipules persistent, sometimes spiny. *Flowers* 1 or 2 together in the axils of the stipules, bisexual, regular or irregular. *Sepals* 5 (or 4), usually free and imbricate. *Petals* 5 (or 4 or 0), hypogynous, free, imbricated or contorted or rarely valvate. *Disk* usually convex or depressed, eglandular. *Stamens* as many as the petals, or twice (or thrice) as many, inserted at the base of the disk; filaments usually bearing a scale at or below the middle; anthers versatile. *Ovary* usually sessile, furrowed angled or winged, (2-) 4-5 (-12)-celled; ovules 1-2 or more in each cell; style simple, terminal. *Fruit* dividing into 2-10 cocci or capsular and septicidally dehiscent. *Seeds* usually 1 in each cell; albumen scanty or 0.

Prostrate silky herbs with pinnate leaves, yellow flowers and prickly fruit.....1. *Tribulus*

Erect prickly woody herbs with 1-3-foliolate leaves, pink flowers and unarmed fruit 2. *Fagonia*.

1. *Tribulus*, Linn.

Prostrate herbs. *Leaves* stipulate, opposite or sometimes alternate, abruptly pinnate. *Flowers* solitary, pseudo-axillary, white or yellow. *Sepals* 5, imbricate. *Petals* 5, spreading, imbricate, fugacious. *Disk* annular, 10-lobed. *Stamens* 10 (or 5);

filaments bare. *Ovary* sessile, hirsute, 5-12-lobed, 5-12-celled; ovules 1-5 in each cell; stigmas 5-12. *Fruit* 5-angled, of 5-12 winged spinous or tuberculate cocci. *Embryo* exalbuminous.

TRIBULUS TERRESTRIS, Linn.; F. B. I. i. 423; W. & A. 145; Wt. Ic. t. 98.

A procumbent herb; leaflets 6-12, 2-5 in. long, oblong, silky; flowers solitary, axillary, 5-1 in. across; fruit of 5 woody cocci, each provided with 2 long hard sharp divaricate spines.

Deccan, in hot dry localities chiefly.

2. Fagonia, Linn.

Erect or prostrate branching herbs, woody at the base. *Leaves* opposite, 1-3-foliate; leaflets entire; stipules often spiny. *Flowers* solitary, pseudo-axillary. *Sepals* 5, deciduous, imbricate. *Petals* 5, clawed, caducous, imbricate. *Disk* small. *Stamens* 10, on the disk; filaments bare. *Ovary* sessile, 5-angled, of 5 2-ovuled cells, narrowed into a subulate style; stigma simple. *Fruit* of 5 1-seeded dehiscent cocci. *Seeds* compressed; albumen horny; cotyledons broad.

FAGONIA ARABICA, Linn.; F. B. I. i. 425. *F. mysorensis*, Roth; W. & A. 145; Wt. Ill. i. t. 64.

A small branched woody plant, the small pink flowers and globular capsules immersed in the copious thin straight spines.

Deccan, in dry localities in Kurnool, Anantapur, etc., often on black cotton soil.

Family XXXIII. GERANIACEAE.

Herbs, shrubs or rarely trees. *Leaves* opposite or alternate, usually 2-stipulate. *Flowers* bisexual, regular or irregular, solitary fascicled umbelled cymose or racemose; peduncles usually axillary. *Sepals* usually 5 and imbricate, posticous sometimes spurred. *Petals* 5 or fewer or 0. *Torus* raised in the centre. *Disk* of 5 glands or 0. *Stamens* 4-5 or 10 (or 15); anthers versatile. *Ovary* (2-) 3-5 lobed, 3-5-celled, prolonged above into a beak bearing capitate or linear stigmas or into sessile stigmas; ovules 1-2-many in each cell. *Fruit* a 3-5-lobed capsule or a berry, lobes 1-seeded and separating from the axis or many-seeded. *Seeds* usually with little or no albumen.

Flowers regular; sepals herbaceous, not spurred, imbricate; stamens 10; leaves simple and palminerved or compound:—

Leaves simple, palminerved; glands on the torus 5, alternating with the petals; capsules beaked, the valves when dehiscent rolled elastically upwards.....1. **Geranium.**

Leaves compound; glands on the torus 6; capsules not beaked:—

Herbs; fruit capsular:—

Leaves 3-foliolate; capsule valves cohering with the axis

2. **Oxalis.**

Leaves abruptly pinnate; capsule valves detaching from the axis

3. **Biophytum.**

Trees; leaves pinnate; fruit indehiscent, fleshy; 5 stamens often reduced to staminodes 4. **Averrhoa.**

Flowers irregular; leaves simple, penninerved; sepals usually petaloid, the upper spurred; stamens 5 with subconnate anthers:—

Lateral petals connate in pairs; fruit capsular, elastically dehiscent

4. **Impatiens.**

Lateral petals free; fruit a drupe with a bony pyrene...5. **Hydrocera.**

1. **Geranium, Linn.**

Herbs or undershrubs. *Leaves* stipulate. *Peduncles* axillary, bracteate, 1-2-flowered or bearing umbels. *Flowers* regular. *Sepals* and *petals* 5 each, imbricate. *Disk* represented by 5 interpetaline glands. *Stamens* 10; free or shortly united at the base, anthers 10 (or rarely only 5). *Ovary* beaked, 5-lobed, 5-celled; styles 5; ovules 2-3, superposed. *Capsule* 5-lobed, 5-celled; cells 1-seeded, usually separated from the axis by the elastic curving of the lower portions of the beak. *Seeds* with albumen usually 0; cotyledons induplicate or contorted.

GERANIUM NEPALENSE, Sweet; F. B. I. i. 430. *G. affine*, W. & A. 133 (not of Ledeb.); Wt. III. i. t. 59.

A slender diffuse perennial with pentagonal deeply 3-5-lobed leaves, the lobes cut into strap-shaped segments; flowers 3-5 in. across; carpels hairy; seeds shining, smooth.

Nilgiri and Pulney Hills, usually above 6,000 ft.

Various garden species of *Pelargonium* are found run wild about the Nilgiri Hill stations; one, *Pelargonium grossularioides*, DC., of S. Africa, appears to be fully naturalized, as is *Erodium cicutarium*, Leman, of Europe and N. India.

2. *Oxalis*, Linn.

Acid herbs, rarely woody. *Leaves* radical or cauline and alternate, usually digitate, 3-many-foliolate. *Flowers* on axillary or radical 1-many-flowered peduncles, usually umbellate, regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, contorted. *Disk* without glands. *Stamens* 10, filaments free or united at base. *Ovary* of 5 1-many-ovuled cells; styles 5, distinct. *Capsule* loculicidal. *Seeds* with an outer fleshy coat bursting elastically; albumen fleshy.

OXALIS CORNICULATA, Linn.; F. B. I. i. 436; W. & A. 142; Wt. Ic. t. 18.

A diffuse creeping weed with long-stalked trifoliolate leaves with obcordate leaflets; flowers yellow, umbellate, on slender peduncles.

Common in most Districts and at all elevations, especially troublesome in garden soil.

3. *Biophytum*, DC.

Annual or perennial herbs, often with woody stems. *Leaves* crowded at the ends of the stem and branches, abruptly pinnate; leaflets opposite, oblique. *Flowers* dimorphous, in small umbels; peduncles terminal. *Sepals* 5. *Petals* 5, yellow, connate with a salver-shaped corolla. *Stamens* 10, 5 inner ones longer; filaments free. *Ovary* 5-celled; styles 5; stigmas notched or 2-fid. *Capsule* dehiscing loculicidally into 5 spreading valves. *Seeds* like those of *Oxalis*.

Stem simple:—

Leaflet main nerves thick, rarely straight, irregular; sepals usually longer than the capsule:—

Leaflet main nerves numerous, secondary many; leaflets many pairs (8-15); peduncles long; seeds ovoid, acute:—

Leaflets nearly glabrous; seeds prominently ridged, not tubercled; pedicels very short (.1 in.) or 0; stem generally short...1. *sensitivum*.

Leaflets strigosely hirsute; seeds ridged, the ridges with tubercled margins; pedicels short (.1-2 in.), slender; stem often long, sometimes stout 2. *Candolleianum*.

Leaflet main nerves very few, secondary almost none; leaflets few (5-7) pairs; peduncles very short or 0; pedicels .2 in. long; seeds flattened, ovate, obtuse, with scattered tubercles and no ridges; stems slender 3. *Apodiscias*.

Leaflet main nerves slender, oblique, straight; leaflets many (more than 10) pairs; sepals as long as or shorter than the capsule; seeds ovoid, tubercled in spiral lines; peduncles long; pedicels 2-3 in. long, slender; stems often long, usually slender.....4. *Reinwardtii*. Stem branched; seeds tubercled, the tubercles in oblique lines; leaves more or less strigosely hirsute, sharply cuspidate at apex:—

Leaves 3-5 in. long; leaflets 15-25 pairs, oblong, 4-5 in. long; pedicels 15 in. long; sepals glandular villous.....5. *intermedium*.

Leaves 2-3 in. long; leaflets 30-50 pairs, falcate, 1-2 in. long; pedicels 1 in. long; sepals glabrous.....6. *polyphyllum*.

1. BIOPHYTUM SENSITIVUM, DC.; F. B. I. T. 436 (*in part*). *Oxalis sensitiva*, L.; W. & A. 142 (*in part*).

Circars, Deccan and Carnatic, usually in open places, on roadsides, banks and cultivated ground.

2. BIOPHYTUM CANDOLLEANUM, Wt. Ill. i. 161, t. 62. *B. sensitivum*, var. *Candolleana*, Edgw. & Hook. f. in F. B. I. i. 437.

W. Gháts, banks and roadsides in Nilgiris, up to 6,000 ft. usually in shady places.

3. BIOPHYTUM APODISCIAS, Turcz.; F. B. I. i. 437.

Mysore or Carnatic (G. Thomson).

4. BIOPHYTUM REINWARDTII, Edgw. & Hook. f.; F. B. I. i. 437.

W. Coast and W. Gháts, from S. Canara to Cochin and the Anamalai Hills, up to 6,000 ft.

5. BIOPHYTUM INTERMEDIUM, Wt. Ill. i. 162; F. B. I. i. 438.

W. Gháts, in the Pulney Hills, up to 7,000 ft.

6. BIOPHYTUM POLYPHYLLUM, Munro in Wt. Ill. i. 162; F. B. I. i. 439.

W. Gháts, Sholas of the W. Nilgiris, at about 6,000 to 7,000 ft.

Averrhoa contains two fruit trees whose native country is unknown, but which are found in gardens in many places in S. India and cultivated for their fruits which are acid and are made into tarts and preserves or pickled. They are distinguished thus:—

Leaflets 2-5 pairs, glabrous and glaucous beneath; fruits with angular lobes A. *Carambola*, L.

Leaflets 5-17 pairs, pubescent beneath; fruits with rounded lobes

A. *Bilimbi*, L.

4. *Impatiens*, Linn.

Annual or perennial herbs or rarely a little shrubby at the base. *Leaves* simple. *Flowers* irregular, axillary, solitary fascicled racemed or umbelled or sometimes scapose. *Sepals* 3 (or 5), coloured, imbricate, 2 lateral ones small flat usually green, posterior (*lip*), the lower in the flower, large, petaloid, often spurred. *Petals* 3 (or 5) the anterior (*standard*) erect, the side ones (*wings*) entire or 2-3-lobed, sometimes with a short or long and slender appendage at the base. *Stamens* 5; anthers cohering, nearly sessile. *Disk* 0. *Ovary* oblong, 5-celled; ovules many, 1-seriate in each cell; stigma sessile, 5-toothed. *Capsule* short or long, loculicidally dehiscent; valves 5, elastic. *Seeds* smooth or tubercled; albumen c.

(Analysis after Sir J. D. Hooker in *Rec. Bot. Surv. Ind.* iv. 37, and subsequent descriptions.)

Scapigerous plants with tuberous rootstock; leaves all radical; flowers racemose; seeds very minute, clothed with spiral hairs (Section 1. *SCAPIGERAE*):—

Lip with a very long incurved spur:—

Wings 2-lobed 1. *acaulis*.

Wings 3-lobed 2. *scapiflora*.

Lip with a short spur; wings 3-lobed:—

Dorsal auricle of wings obscure or 0:—

Spur of lip incurved, lip inflated 3. *Beddomei*.

Spur of lip incurved, cylindric 4. *Levingei*.

Spur of lip straight, standard entire 5. *modesta*.

Spur of lip short, standard crenate 6. *crenata*.

Dorsal auricle of wings produced into the spur of the lip:—

Dorsal auricle long slender:—

Tall, spur of lip elongate 7. *Denisonii*.

Dwarf, spur of lip short 8. *Barberi*.

Dorsal auricle short spiniform 9. *Lawsoni*.

Lip spurless 10. *orchioides*.

Epiphytic perennial herbs, succulent, with very short simple or sparingly branched, often annulate or articulate, stem; leaves alternate, usually fascioled at the ends of the branches; flowers on simple or branching few-flowered peduncles; wings very short, thick, almost concealed in the mouth of the lip and concave standard (Section 2. *EPIPHYTICAE*):—

Lip scarlet:—

Sepals small, elliptic, green; standard and wings yellow

11. *Jerdoniae*.

Sepals large, oblong, pendulous, scarlet; standard green, wings purple

12. *auriculata*.

Sepals linear, green; standard green, dorsally broadly winged

13. *parasitica*.

Lip green; sepals linear-oblong; flowers all green 14. *viridiflora*.

Annual herbs; leaves opposite; flowers pedicelled, solitary binate or fascicled in the axils of the leaves, without peduncle; ebracteate or minutely bracteate at base; sepals elongate, linear, rarely ovate or lanceolate; seeds glabrous (except *Gardneriana*), usually globose, black and polished (Section 3. ANNUAE):—

Sepals linear or linear-lanceolate; seeds black and shining:—

Spur of lip slender, usually longer than the wings, sometimes shorter or 0:—

Stem stiff, usually simple; leaves broad or narrow, coriaceous:—

Spur longer than or at least as long as wings; flowers large; leaves more or less serrate

15. *chinensis*.

Spur quite short, incurved; flowers small; leaves nearly entire:—

Flowers 6–8 in. long, rose or rose-purple

16. *rupicola*.

Flowers 2–4 in. long, violet-blue

17. *rivulicola*.

Stem flaccid, usually branched; leaves broad or narrow, subentire

18. *diversifolia*.

Stem slender; basal lobe of wings 0, dorsal auricle filiform

19. *ligulata*.

Stem slender, flaccid; wings long stipitate; basal lobe minute or 0, dorsal auricle 0:—

Leaves elliptic-lanceolate, 1–2.5 in. long; capsule .5 in. long

20. *Kleinii*.

Leaves oblong-lanceolate, 3–5 in. long; capsule .75 in. long

21. *Rheedii*.

Stem slender, flaccid; leaves oblong, entire; wings long stipitate; basal lobe lanceolate, dorsal auricle small, opposite to it

22. *lenta*.

Stem slender, flaccid; wings shortly stipitate; basal lobe small, dorsal auricle decurved

23. *tenella*.

Stem much branched; wings sessile; basal lobe minute, dorsal auricle minute near the base

24. *debilis*.

Spur of lip very short or 0:—

Lip scaphiform or cymbiform, spur of lip very minute or 0:—

Flowers white or rose, very small:—

Leaves ovate or oblong.....25. *pusilla*.

Flowers large or medium-sized, smaller in *I. dasysperma* :—

Capsule pilose or tomentose :—

Lip spurred ; seeds globose, spur incurved :—

Seeds smooth 43. *Balsamina*.

Seeds minutely hirtellous 44. *trichocarpa*.

Lip spurless ; seeds minute, granulate.....45. *scabriuscula*.

Capsule glabrous ; seeds glabrous or papillose ; spur of lip long :—

Seeds small, minutely papillose :—

Spur of lip 1-1.5 in. long 46. *flaccida*.

Spur of lip 0.6 in. long.....47. *dasysperma*.

Seeds large, rugose, glabrous ; flowers large 48. *pulcherrima*.

Shrubby ; leaves alternate, hairy on both surfaces ; flowers pedicelled, the pedicels solitary in the axils of the leaves without peduncle, ebracteate ; standard and lip tomentose (Section 2. TOMENTOSAE) :—

Flowers small, white and red, wings short 49. *Munronii*.

Flowers very large, white, wings large.....50. *Hensloviana*.

Herbs or shrubs ; leaves opposite or alternate rarely whorled ; flowers umbellate or in very contracted racemes terminating a long axillary peduncle ; pedicels bracteate at the base (Section 6. SUBUMBELLATAE) :—

Shrubs or large branching herbs :—

Leaves alternate ; sepals orbicular, ovate or oblong, .25-.75 in. long :—

Spur longer than the limb of the lip :—

Flowers very large ; sepals oblong, acute ; lip with spur tubiform 51. *grandis*.

Flowers medium-sized ; sepals orbicular, cuspidate ; bracts slender 52. *fruticosa*.

Flowers medium-sized ; sepals ovate-acuminate, bracts ovate 53. *viscida*.

Spur shorter than limb of the lip or 0 :—

Sepals ovate, aristately acuminate ; spur of lip .1 in. long or 0 54. *campanulata*.

Sepals oblong, acute ; spur of lip .25-.5 in. long 55. *disotis*.

Leaves opposite and whorled ; sepals linear ; spur long, slender 56. *verticillata*.

Annual herbs :—

Leaves all opposite :—

Dorsal auricle of wings filiform, enclosed in the spur of the lip, except sometimes in *I. omissa* ; peduncle many-flowered :—

Leaves ovate, petioled, 1-2 in. long :—

Spur of lip shorter or longer than the wings, not inflated 57. *Goughii*.

Spur of lip longer than the wings, inflated 58. *viscosa*.

Leaves oblong or elliptic, subsessile, 25-1 in. long...59. *omissa*.
 Dorsal auricle of wings minute; peduncle 1-flowered; leaves 2-5 in. long, subsessile 60. *parvifolia*.

Leaves all alternate :—

Leaves scattered on the stem and branches :—

Spur of lip long, slender.....61. *cordata*.
 Spur of lip short, stout, tip incurved 62. *uncinata*.
 Spur of lip short, slender, straight 63. *verecunda*.
 Spur of lip 0 64. *elegans*.

Leaves rosulate at the top of the simple stem :—

Spur of lip long and slender 65. *umbellata*.
 Spur of lip short, stout 66. *travancorica*.

Shrubs; leaves alternate; flowers in elongate peduncled axillary racemes; pedicels bracteate at the base; sepals orbicular or broadly oblong; lip spurred; seeds various (Section 7. *RACEMOSAE*) :—

Leaves long-petioled, ovate :—

Distal lobe of wings stipitate with a minute basal lobe at the base of the stipes.....67. *maculata*.

Distal lobe of wings sessile :—

Lip tubiform, incurved throughout its length 68. *phoenicea*.

Lip cymbiform or infundibular; spur short, incurved

69. *Wightiana*.

Leaves subsessile, lanceolate.....70. *Tangachee*.

1. *IMPATIENS ACAULIS*, Arn.; F. B. I. i. 443.

W. Ghâts, up to 7,000 ft. in Nilgiris.

Flowers rather large, pale pink.

2. *IMPATIENS SCAPIFLORA*, Heyne; F. B. I. i. 443. *I. rivalis*, Wt. Ic. t. 751; F. B. I. i. 444.

W. Ghâts from S. Canara to Travancore, at 6,000 to 8,000 ft., usually on dripping rocks.

Flowers pink, darker at the base of the wing.

3. *IMPATIENS BEDDOMEI*, Hook. f. in F. B. I. i. 442.

W. Ghâts, at 6,000 to 8,000 ft. in Nilgiris, on the downs.

Flowers white with yellow patches on the wings.

4. *IMPATIENS LEVINGEI*, Gamble ex Hook. f. in Rec. Bot. Surv. Ind. iv. 45

W. Ghâts, in the Nilgiri Hills, at 6,000 ft., on rocks near Coonoor and Hulikal (Gamble, Livinge).

Flowers carmine-red.

5. *IMPATIENS MODESTA*, Wt. Ic. t. 968; F. B. I. i. 442.

- W. Gháts, in the Nilgiri, Anamalai and Sivagiri Hills, at 6,000 ft.
Flowers pink.
6. *IMPATIENS CRENATA*, Bedd.; F. B. I. i. 442.
W. Gháts, in the Anamalai Hills, at 5,000 to 8,000 ft.
Flowers blue inside.
7. *IMPATIENS DENISONII*, Bedd. Ic. t. 151; F. B. I. i. 444.
W. Gháts, on the Sispara Ghát, Nilgiris, at 3,000 to 5,000 ft.
Flowers pink.
8. *IMPATIENS BARBERI*, Hook. f. in. Rec. Bot. Surv. Ind. iv. 45.
W. Gháts, at Cadamanj in Mysore (Parber).
9. *IMPATIENS LAWSONI*, Hook. f. in Rec. Bot. Surv. Ind. iv. 45.
W. Gháts, in the Nilgiri Hills.
10. *IMPATIENS ORCHIOIDES*, Bedd. Ic. t. 152; F. B. I. i. 443.
W. Gháts, on tree-trunks at Avalanché, Nilgiris, 8,000 ft.
Flowers reddish brown, a very small species.
11. *IMPATIENS JERDONIAE*, Wt. Ic. t. 1602; F. B. I. i. 460,
excl. I. parasitica, Bedd.
W. Gháts, on tree-branches and moist rocks at Sispara Ghát, 3,000 to 5,000 ft., Anamalai Hills at 7,000 ft.
A succulent epiphyte with thick stems.
12. *IMPATIENS AURICULATA*, Wt.; F. B. I. i. 460.
W. Gháts, on tree-trunks, hills of Tinnevelly and Travancore, above 5,000 ft.
A succulent epiphyte with swollen stem-internodes.
13. *IMPATIENS PARASITICA*, Bedd. Ic. t. 140. *I. Jerdoniae* var. *parasitica*, Hook. f. in F. B. I. i. 460.
W. Gháts, on tree-trunks on the Anamalai Hills at 5,000 to 7,000 ft.; Hills of Cochin and Travancore.
A very succulent epiphyte, with swollen internodes.
14. *IMPATIENS VIRIDIFLORA*, Wt.; F. B. I. i. 460; Bedd. Ic. t. 141.
W. Gháts, epiphytic on tree-trunks in the Sivagiri Hills, Tinnevelly, at 5,000 ft. (Wight).
A fleshy epiphyte.
15. *IMPATIENS CHINENSIS*, Linn.; F. B. I. i. 444. *I. fasciculata*, Lamk.; Wt. Ic. t. 74; W. & A. 128.
E. Gháts, Madgol Hills, at 5,000 ft.; W. Gháts, common in all Districts in wet places and pastures at 5,000 to 8,000 ft.
Flowers rose-purple to white.

16. *IMPATIENS BUPICOLA*, Hook. f. in Kew Bull. 1910, 292.
Mysore at Shimoga, 2,000 to 3,000 ft. (Meebold).
17. *IMPATIENS BIVULICOLA*, Hook. f. in Kew Bull. 1911, 354.
W. Gháts, in the Puriar Valley, Travancore, 4,000 ft. (Meebold), borders of streams.
18. *IMPATIENS DIVERSIFOLIA*, Wall.; F. B. I. i. 446; W. & A. 139.
W. Gháts, from S. Canara to Travancore: in Nilgiris, up to 6,000 ft.
Flowers rose.
19. *IMPATIENS FIGULATA*, Bedd. Ic. t. 149; F. B. I. i. 446.
W. Gháts, Anamalai Hills at 1,500 to 2,500 ft., Hills of Malabar, Cochin and Travancore.
Flowers pink or white.
20. *IMPATIENS KLEINII*, W. & A. 140; F. B. I. i. 445; Wt. Ic. t. 884; Hook. f. in Kew Bull. 1910, 293.
W. Coast and Gháts, in most Districts, from sea-level up to 6,000 ft.
A slender plant, scarcely 1 ft. high, flowers violet-purple.
21. *IMPATIENS RHEEDII*, W. & A. 138.
W. Gháts, in Malabar at low elevations (Barber, Bourne).
Flowers pink or mauve with darker streaks.
22. *IMPATIENS EZNTA*, Hook. f. in Hook. Ic. t. 2913.
W. Gháts, in the Nilgiri Hills (Perrottet).
Flowers lilac (?).
23. *IMPATIENS TENELLA*, Heyne; W. & A. 140; F. B. I. i. 447
excl. syn. I. rosmarinifolia, Retz.
W. Gháts, in the Nilgiris, at 6,000 ft.
A slender plant scarcely 10 in. high, flowers pink (?).
24. *IMPATIENS DEBILIS*, Turcz. in the Bull. Soc. Imp. Nat. Mosc. xxxii. i. 272; Hook. Ic. t. 2911.
W. Gháts, in the Nilgiri Hills (Perrottet).
Flowers small, pink.
25. *IMPATIENS PUSILLA*, Heyne; Hook. f. in Kew Bull. 1910, 293. *I. inconspicua*, Benth.; F. B. I. i. 447; W. & A. 139; Wt. Ic. t. 970. *I. rosmarinifolia*, Wt. Ic. t. 750 (not of Retz).
W. Gháts, in all Districts at 3,000 to 8,000 ft., very common in Ootacamund Cinchon Plantations, under trees.
A small herb scarcely 1 ft. high, flowers white streaked with lilac.

26. *IMPATIENS HERBICOLA*, Hook. f. in Kew Bull. 1911, 354.
W. Gháts, in Travancore Hills, at 4,500 ft., in grass (Meebold); Ibex Hill, Anamalais (Fischer).
27. *IMPATIENS LAWII*, Hook. f. and Th.; F. B. I. i. 448.
W. Gháts, Bababuden Hills of Malabar (Law).
Flowers purple or rose.
28. *IMPATIENS NATALIAE*, Hook. f. in Kew Bull. 1910, 294.
N.-W. Mysore, at Kumsi in Shimoga, up to 3,000 ft. (Meebold).
Flowers white with a pink spur.
29. *IMPATIENS OPPOSITIFOLIA*, Linn.; F. B. I. i. 448; W. & A. 139; Wt. Ic. t. 883.
W. Gháts, in all Districts, common at 3,000 to 5,000 ft.
Flowers pink.
30. *IMPATIENS PALLIDIFLORA*, Hook. f. in Kew Bull. 1911, 354.
W. Gháts, straggling among grass at Devicolum in Travancore, 7,000 ft. (Meebold).
Flowers pink.
31. *IMPATIENS TOMENTOSA*, Heyne; W. & A. 139; F. B. I. i. 449; Wt. Ic. t. 749. *I. rufescens*, Benth.; W. & A. 138; Wt. Ic. t. 969.
W. Gháts, Nilgiris to Travancore, in boggy places, at 5,000 to 8,000 ft.
Flowers pink.
32. *IMPATIENS CONCIINNA*, Hook. f. in F. B. I. i. 449.
W. Gháts, in Malabar? (Wight).
33. *IMPATIENS GARDNERIANA*, Wt. Ic. t. 1050; F. B. I. i. 445. *I. setosa*, Hook. f. & T.; F. B. I. i. 445.
W. Gháts, below Sispara, in W. Nilgiris, in moist pasture, 1,500 to 5,000 ft.; Wynad in Malabar.
Flowers bright red or purple.
34. *IMPATIENS LESCHENAUHII*, Wall.; F. B. I. i. 450; W. & A. 136; Wt. Ic. t. 970 *bis*.
W. Gháts, common, in the Nilgiri and Pulney Hills at 3,000-8,000 ft.
An erect shrub of Shola forest, flowers pink or white, the lip yellow.
35. *IMPATIENS LATIFOLIA*, Linn.; F. B. I. i. 450 *excl. syn.* *I. cuspidata*, W. & A.; W. & A. 138 (*in part*). *I. bababudanensis*, Hook. f. in Kew Bull. 1910, 295 (probably).

W. Gháts, S. Canara to the Pulney Hills, up to 8,000 ft.

A shrub, flower pale purple.

86. *IMPATIENS CUSPIDATA*, Wt. Ic. t. 741.

W. Gháts, in the Nilgiri Hills at 5,000 to 7,000 ft.

A shrubby plant with conspicuous glaucous-white stem and branches; flowers pink.

87. *IMPATIENS FLORIBUNDA*, Wt. *I. flaccida*, Arn.; F. B. I. i. 457 (in part).

W. Gháts, from Nilgiri Hills, 6,000 to 7,000 ft., to Travancore.

88. *IMPATIENS MACROCARPA*, Hook. f. in Kew Bull. 1911, 855.

W. Gháts, in Travancore at about 6,000 ft. (Meebold).

A tall weak subshrubby species.

89. *IMPATIENS COCHINICA*, Hook. f. in Kew Bull. 1911, 855.

W. Gháts, in Cochin, at Kalvalay, near a stream, about 2,000 ft. (Meebold).

A small semishrubby species.

40. *IMPATIENS LUCIDA*, Heyne; F. B. I. i. 451, excl. syn. *I. latifolia*, W. & A.

W. Gháts, from S. Canara to Travancore, up to 4,000 ft.

41. *IMPATIENS PENDULA*, Heyne; F. B. I. i. 455; W. & A. 137.

W. Gháts, in the Bababudan Hills of Mysore (Rottler).

42. *IMPATIENS MYSORENSIS*, Roth; F. B. I. i. 456; W. & A. 137.

W. Gháts, in Mysore (Rottler).

43. *IMPATIENS BALSAMINA*, Linn.; F. B. I. i. 453; W. & A. 135. *I. arcuata*, Wall.; W. & A. 136.

In all Districts, in hilly regions but at low levels.

The wild form of the garden Balsam, very variable in size, leaf and flower; flowers usually pink.

44. *IMPATIENS TRICHOCARPA*, Hook. f. in Hook. Ic. t. 2914.

W. Gháts, in the Nilgiri Hills (Perrottet).

45. *IMPATIENS SCABRIUSCULA*, Heyne; F. B. I. i. 454; Bedd. Ic. t. 144.

W. Gháts, from S. Canara and Goorg to the Wynaad and Nilgiris, up to 6,000 ft.

A small species, sometimes scarcely 6 in., occasionally up to 18 in. high, flowers pink.

46. *IMPATIENS FLACCIDA*, Arn.; F. B. I. i. 457 *excl.* Bot. Mag. t. 5625, etc.

W. Gháts, in the Sivagiri Hills of Tinnevelly; W. Coast, in Cochin at Trichoor. Flowers rose-purple.

47. *IMPATIENS DASYSPERMA*, Wt. Ic. t. 742; F. B. I. i. 457.

W. Gháts, Hills of Mysore, Courtallum in Tinnevelly, up to 8,000 ft.

48. *IMPATIENS PULCHERRIMA*, Dalz., F. B. I. i. 458.

W. Gháts, in Mysore (*fide* Hook. f.).

Flowers rose or violet-purple.

49. *IMPATIENS MUNRONII*, Wt. Ill. i. 160, Ic. t. 1049; F. B. I. i. 458.

W. Gháts, in forest round Sispara, Nilgiris, at 5,000 to 6,500 ft.

An undershrub, up to 2 ft. high, flowers white and red.

50. *IMPATIENS HENSLOVIANA*, Arn.; F. B. I. i. 458. *I. albida*, Wt. Ic. t. 748.

W. Gháts, in the Nilgiri, Pulney and Tinnevelly Hills, in ravines and clefts of rocks at 2,000 to 7,000 ft.

An undershrub with large white flowers and stems with many prominent scars of fallen leaves.

51. *IMPATIENS GRANDIS*, Heyne; F. B. I. i. 463; W. & A. 187; Bedd. Ic. t. 158.

W. Gháts, Hills of S. Travancore and Tinnevelly at 1,000 to 4,000 ft.

Tall and shrubby, flowers white flaked with crimson.

52. *IMPATIENS FRUTICOSA*, DC.; F. B. I. i. 459; W. & A. 187; Wt. Ic. t. 966.

W. Gháts, common in the Nilgiri, Pulney and Travancore Hills at 5,000 to 6,000 ft., in Shola forests.

An erect shrub, reaching 8 ft. in height, flowers pink.

53. *IMPATIENS VISCIDA*, Wt.; F. B. I. i. 462; Wt. Ic. t. 746.

W. Gháts, Pulney Hills, in Madura District, at 5,000 to 7,000 ft., in wet swampy ground.

Stem reaching 2-3 ft. in height, flowers light purple or deep pink.

54. *IMPATIENS CAMPANULATA*, Wt.; F. B. I. i. 463; Wt. Ic. t. 744.

W. Gháts in the Nilgiri, Anamalai and Pulney Hills at 6,000 to 7,000 ft.

An erect herb reaching 5 ft. in height, flowers white and yellow, speckled with purple.

55. *IMPATIENS DISOTIS*, Hook. f. in Rec. Bot. Surv. Ind. iv. 48.

W. Gháts, in the Hills of Travancore and Tinnevely at 4,000 ft.

An erect herb, flowers white.

56. *IMPATIENS VERTICILLATA*, Wt.; F. B. I. i. 452.

W. Gháts, in the Anamalais, the Hills of Cochin, the Sivagiri Hills of Tinnevely, in gravelly beds of streams at 3,000 ft., and the Travancore Hills at 4,000 to 5,000 ft.

A herb, up to 18 in. high; flowers bright red or scarlet.

57. *IMPATIENS GOUGHII*, Wt. Ill. i. 160; Wt. Ic. t. 1603; F. B. I. i.

452. *I. anamallayensis*, Bedd. Ic. t. 150. *I. microtheca*, Hook. f. in Hook. Ic. t. 2910.

W. Gháts, in the Nilgiri, Anamalai, Pulney and Travancore Hills at 5,000 to 8,000 ft.

A slender annual, reaching about 12 in. in height at most; flowers pink, on long filiform peduncles.

58. *IMPATIENS VISCOSA*, Bedd.; F. B. I. i. 453.

W. Gháts, in the Anamalai Hills and the Hills of Malabar, Cochin and Travancore at 3,000 to 4,000 ft.

59. *IMPATIENS OMISSA*, Hook. f. in Rec. Bot. Surv. Ind. iv. 48.

W. Gháts, Anamalai and Pulney Hills at 6,000 to 7,000 ft.

A very small slender plant.

60. *IMPATIENS PARVIFOLIA*, Bedd.; F. B. I. i. 453; Bedd. Ic. t. 142.

W. Gháts, on rocks on the top of Akka Mountain, Anamalais, at 8,000 to 8,600 ft. (Beddome).

A very small species, scarcely 6 in. high, flowers pale pink with crimson blotches.

61. *IMPATIENS CORDATA*, Wt.; F. B. I. i. 462.

W. Gháts, in the Wynaad, the Anamalai Hills at 3,000 to 5,000 ft., Sivagiri Hills of Tinnevely and Hills of Travancore.

A small plant about 1 ft. high; flowers lilac with a purple centre.

62. *IMPATIENS UNCINATA*, Wt.; F. B. I. i. 465; Wt. Ic. t. 747.

W. Gháts, in dense moist forests about Courtallum in Tinnevely (Wight).

A small plant scarcely 10 in. high with the spur of the lip hooked.

63. *IMPATIENS VERECUNDA*, Hook. f. in Kew Bull. 1911, 356.
W. Gháts, at Periakanal and Devicolam, Travancore, at 4,000 to 5,000 ft. (Meebold), under trees.
A small herb about 6 in. high, flowers rose.
64. *IMPATIENS ELEGANS*, Bedd. Ic. t. 145; F. B. I. i. 465.
W. Gháts, common on the Anamalai Hills and Hills of Travancore at 2,500 to 5,000 ft. (Beddome).
A small plant up to 1 ft. high; flowers pale rosy-white, with a purple eye.
65. *IMPATIENS UMBELLATA*, Heyne; F. B. I. i. 461; W. & A. 137; Wt. Ic. t. 745.
W. Gháts, in moist forests near Courtallum in Tinnevely.
A small plant, scarcely 8 in. high; leaves broadly orenate often purplish beneath.
66. *IMPATIENS TRAVANCORICA*, Bedd. Ic. t. 148; F. B. I. i. 464.
W. Gháts, at Myhendra and Aghasteer, Travancore Hills, 4,000 to 5,000 ft. (Beddome).
A small plant, scarcely 8 in. high; flowers white streaked with red, leaves crenate, ciliate in the crenatures.
67. *IMPATIENS MACULATA*, Wt.; F. B. I. i. 465.
W. Gháts, Sivagiri Hills of Tinnevely at 4,000 to 7,000 ft., Hills of Travancore at 5,000 ft.
A tall slender herb reaching 6 ft. in height.
68. *IMPATIENS PHOENICEA*, Bedd.; F. B. I. i. 466; Bedd. Ic. t. 148.
W. Gháts, abundant in the higher Sholas of the Pulney Hills at 5,000 to 7,000 ft.
An erect suffruticose herb; flowers brilliant scarlet, yellow in the centre.
69. *IMPATIENS WIGHTIANA*, Bedd. Ic. t. 146; F. B. I. i. 467.
W. Gháts, in moist forests on the Anamalais at 3,000 to 4,500 ft. (Beddome).
An erect branched suffruticose herb; flowers white, the standard and wings mottled with pink.
70. *IMPATIENS TANGACHEE*, Bedd. Ic. t. 147; F. B. I. i. 467.
W. Gháts, in river-beds on the higher ranges of the Anamalais, above 4,000 ft.; Bolumpatti Hills of Coimbatore.
A short, simple or forked herb up to 10 in. high with subprocumbent stem; flowers bright rose.

5. Hydrocera, Blume.

Erect aquatic herbs. *Leaves* narrow, alternate; stipules 0. *Flowers* irregular, on short axillary 1-2-flowered peduncles. *Sepals* 5, petaloid, imbricate, the 2 lateral outer flat, the posterior spurred. *Petals* 5, anterior outermost in bud large, concave. *Disk* 0. *Stamens* 5; filaments short, broad; anthers connate. *Ovary* 5-celled; stigmas 5, sessile; ovules 2-3 in each cell. *Fruit* an indehiscent drupe with a bony, truncate, 5-celled stone. *Seed* in each cell solitary, curved, corrugated; albumen 0; cotyledons thick; radicle short, superior.

HYDROCERA, TRIFLORA, W. & A. 146; F. B. I. i. 483.

An annual water-weed with fistular floating stems rooting at the nodes, linear-lanceolate leaves and red globose succulent fruit.

Ditches and tanks in the Carnatic.

Family XXXIV. RUTACEAE.

Trees or shrubs, sometimes climbing, rarely herbs, abounding in pellucid glands filled with essential oil. *Leaves* opposite or alternate, usually compound, exstipulate. *Flowers* usually hermaphrodite and regular, in axillary or terminal cymes or panicles, never in spikes, rarely in racemes. *Calyx* of 4-5, rarely 3, small lobes. *Petals* 4-5, rarely 3, hypogynous, valvate or imbricate. *Disk* annular, crenate or lobed, sometimes elongate. *Stamens* usually either as many as the petals or twice as many, sometimes more; filaments usually free, inserted around the disk; anthers 2-celled, introrse. *Ovary* of 4-5, sometimes 3, sometimes more, free or connate carpels; styles as many as the carpels, free or more or less connate; stigmas terminal, entire or lobed; ovules usually 2 in each cell, sometimes numerous. *Fruit* a capsule, berry or drupe, or of 1-4 capsular cocci. *Seeds* usually solitary in the cells, sometimes numerous; testa various; albumen fleshy or 0; embryo straight or curved; radicle superior.

Seeds albuminous; flowers usually polygamous or monoecious:—

Fruit dehiscent, of 1-5 separate 1-seeded carpels:—

Leaves opposite; unarmed trees or shrubs:—

Stamens 4-5; leaves 2-foliolate 1. *Evodia*.

Stamens 8; leaves 1-foliolate 2. *Melicope*.

Leaves alternate; trees or shrubs, usually armed; stamens 3-5; leaves 3- or more-foliolate.....3. **Zanthoxylon.**

Fruit indehiscent, syncarpous:—

Stamens as many as the petals; fruit 4-6-celled; monoecious; prickly shrubs, usually climbing.....4. **Toddalia.**

Stamens usually double as many as the petals; fruit 2-4-celled; unarmed trees:—

Dioecious; petals usually 2; fruit 2-celled; leaves 3-foliolate

5. **Vepris.**

Polygamous; petals 4; fruit 4-celled; leaves 1-foliolate

6. **Acronychia.**

Seeds exalbuminous; flowers usually hermaphrodite:—

Fruit dehiscent, capsular, 3-celled, each cell about 4-seeded; trees with pinnate leaves and small leaflets 7. **Chloroxylon.**

Fruit indehiscent, a berry:—

Ovules 1 or 2 in each cell:—

Style short, persistent; ovule 1 in each cell; leaves 1-foliolate to pinnate 8. **Glycosmis.**

Style articulate at top of ovary, deciduous:—

Unarmed plants; leaves pinnate with alternate leaflets:—

Petals usually valvate; cotyledons much crumpled; stamens 10 9. **Micromelum.**

Petals imbricate; cotyledons plano-convex:—

Filaments dilated below; stamens 8-10, anthers rather large 10. **Clausena.**

Filaments subulate; stamens 10, anthers small

11. **Murraya.**

Armed plants; leaves 1-3-foliolate or pinnate with opposite leaflets:—

Leaves 3-foliolate or imparipinnate with opposite leaflets:—

Calyx distinctly lobed:—

Calyx 3-lobed; stamens 6; leaves always 3-foliolate

12. **Triphasia.**

Calyx 4-5-lobed; stamens 8 or 10; leaves imparipinnate or 3-foliolate 13. **Limonia.**

Calyx cupular, entire or obscurely 4-6-lobed; stamens 8-10; leaves always 3-foliolate 14. **Luvunga.**

Leaves 1-foliolate:—

Anthers linear-oblong; stamens 8-10; disk columnar

15. **Paramignya.**

Ovules more than 2 in each cell; stamens 10 or more; armed trees with large fruits:—

Stamens 10–12; ovary 5–6-celled, at length 1-celled; leaves pinnate; rind of fruit woody; flowers polygamous

17. *Feronia*.

Stamens 20–60; ovary usually many-celled; flowers hermaphrodite:—

Leaves 3-foliolate; stamens 30–60; ovary 8- or more-celled; rind of fruit woody 18. *Aegle*.

Leaves 1-foliolate; stamens 20–60; ovary many-celled; rind of fruit leathery 19. *Citrus*.

1. *Evodia*, Forst.

Trees or shrubs, unarmed. *Leaves* opposite, simple or 1–3-foliolate or imparipinnate; leaflets entire, pellucid-punctate. *Flowers* small, unisexual, in axillary paniculate cymes. *Sepals* 4–5, imbricate. *Petals* 4–5, sessile, valvate or slightly imbricate. *Disk* 4–5-lobed. *Stamens* 4–5, inserted at the base of the disk, in ♀ replaced by staminodes; filaments subulate; anthers oblong. *Ovary* deeply 4-lobed, 4-celled; ovules 2 in each cell; style basilar; stigma 4-lobed. *Fruit* of 4 coriaceous, 3-valved, 1-seeded cocci; endocarp horny, elastically separable, 2-lobed. *Seeds* oblong; testa bony or crustaceous, shining; hilum linear; albumen fleshy; embryo straight, cotyledons ovate.

EVODIA LUNUR-ANKENDA, Merr. *E. Roxburghiana*, Benth.; F. B. I. i. 487. *Zanthoxylum triphyllum*, Juss.; Wt. Ic. t. 204.

A small tree with smooth grey bark; leaves 3-foliolate, petioles up to 4 in. long; leaflets glabrous, shining, obovate or lanceolate, obtuse or acuminate, 2–5 in. long or longer in young plants; nerves 10–18 pairs; cymes variable, sometimes large and spreading; seeds black, shining.

W. Gháts, from Mysore to Tinnevely, up to 7,000 ft., in evergreen and secondary forests; E. Gháts, Rumpa Hills in Godavari.

Wood white, close-grained. Vern. Mal. Kanalei.

2. *Melicope*, Forst.

Shrubs. *Leaves* usually opposite, 1–3-foliolate, pellucid-punctate. *Flowers* in axillary cymes or panicles. *Sepals* 4. *Petals* 4, sessile, valvate or imbricate. *Disk* large, entire or 8-lobed or

obsolete. *Stamens* 8, inserted at the base of the disk, those opposite the petals shorter; filaments subulate or flattened; anthers oblong or cordate. *Ovary* 4-celled, deeply 4-lobed; style basilar or styles 4 subterminal, more or less combined; stigma capitate, 4-lobed; ovules 2 in each cell. *Fruit* of 4 cocci, dehiscing on the inner face. *Seeds* oblong; testa black, shining; albumen fleshy; cotyledons oblong; radicle short, superior.

MELICOPE INDICA, Wt. Ic. t. 1051; F. B. I. i. 492.

A shrub with opposite leaves and unifoliate leaflets with rather long petioles; leaflets elliptic or obovate; flowers 3-5 on long axillary peduncles.

W. Ghâts, in the Kundahs range of the Nilgiris, 6,500 to 8,000 ft.

3. Zanthoxylum, Linn.

Trees or erect or climbing shrubs, often armed with stout prickles. *Leaves* alternate, trifoliate or imparipinnate; leaflets opposite or alternate, entire or crenate, often oblique, pellucid-punctate. *Flowers* small, in axillary or terminal, usually paniculate, cymes, often unisexual. *Calyx* 3-8-fid, rarely 0. *Petals* 3-5, sometimes 0. *Disk* small or obscure. *Stamens* 3-5, hypogynous, reduced to scales in ♀ flowers. *Ovary* in ♂ rudimentary, in ♀ or ♀ flowers of 1-5 oblique 1-celled carpels; styles sublateral, free or connate above; stigmas capitate; ovules 2 in each cell. *Fruit* of 1-5 globose, coriaceous or fleshy 1-seeded carpels dehiscing ventrally; endocarp horny. *Seed* oblong or globose, often hanging out of the carpel; testa shining, hard; albumen fleshy; cotyledons flat; radicle short.

Petals 0; leaves pinnate, the petiole and rhachis winged; a prickly shrub.....1. *alatum*.

Petals present; petiole and rhachis of leaves not winged:—

Leaves 3-foliate; a glabrous shrub, unarmed or with short straight prickles; cymes in slender panicles.....2. *ovalifolium*.

Leaves pinnate:—

Climbing shrub with stems, rhachis of leaf and even leaf-midribs with many hooked prickles; cymes axillary and terminal

3. *tetraspermum*.

Erect trees with many unequal-sided leaflets and conical prickles on stem:—

Leaflets entire, very unequal-sided, rounded on the upper, acute on the lower; large tree.....4. *Rhetsa*.

Leaflets crenate, glandular in the crenatures, slightly unequal-sided ; small tree or treelet 5. *Budrunga*.

1. *ZANTHOXYLUM ALATUM*, Roxb. ; F. B. I. i. 493.

E. Gháts, Hills of Ganjam and Vizagapatam, at about 4,500 ft.

2. *ZANTHOXYLUM OVALIFOLIUM*, Wt. Ill. i. 169 ; F. B. I. i. 492.

W. Gháts, from S. Canara to Tinnevely, up to 4,000 ft.

3. *ZANTHOXYLUM TETRASPERMUM*, W. & A. 148 ; F. B. I. i. 494.

W. Gháts, in Coorg, Nilgiris and Anamalais at 4,000 to 6,000 ft.

4. *ZANTHOXYLUM RHESTA*, DC. ; F. B. I. i. 495 ; W. & A. 148.

E. Gháts, from Ganjam to the Godavari, up to 3,000 ft ;

W. Gháts, in S. Canara, Mysore, Malabar, Anamalais and Travancore at low elevations.

A striking large deciduous tree having cream-coloured corky bark with conical spines. Wood yellowish-grey, moderately hard. The fruits are aromatic, tasting of pepper. Vern.

Tel. Rhesta máu ; Mal. Katta murrakku, Mulillam.

5. *ZANTHOXYLUM BUDRUNGA*, Wall. ; F. B. I. i. 495.

E. Gháts, Madgol Hills of Vizagapatam at 3,500 ft. (A. W. Lushington).

4. *Toddalia*, Juss.

Shrubs, erect or climbing, generally armed with recurved prickles. *Leaves* alternate, trifoliolate, the leaflets obovate, sessile, gland-dotted. *Flowers* small, unisexual, in axillary or terminal cymes or panicles. *Calyx* short, 5-lobed. *Petals* 5-6, oblong, valvate. *Stamens* in ♂ flowers as many as the petals and slightly longer, filaments slender, anthers oblong, introrse, with a small gland on the back ; in ♀ flowers reduced to staminodes with minute rudimentary anthers. *Ovary* in ♂ flowers rudimentary with columnar style ; in ♀ flowers oblong or globose, 5-6-celled ; style 0 ; stigma capitate ; ovules in each cell 2, superposed. *Fruit* subglobose, 4-6-celled, fleshy. *Seeds* one in each cell, angled, reniform, testa crustaceous, albumen fleshy ; embryo curved, cotyledons oblong.

TODDALIA ASIATICA, Lamk. *T. aculeata*, Pers. ; F. B. I. i. 497 ; W. & A. 149 ; Wt. Ill. t. 66.

A very variable plant with three varieties, and occasional intermediates:—

A stout climbing shrub, very prickly; leaflets abruptly obtusely acuminate at apex, 2–4 in. long and 1–1.5 in. broad; flowers rather large; fruit large, fleshy, hardly lobed 1. *floribunda*.

A slender very prickly climbing shrub; leaflets narrow, obtusely acute, 1–2 in. long, .5–.75 in. broad; flowers small, usually in elongate panicles; fruit small, much lobed.....2. *gracilis*.

An erect bush, unarmed or only slightly prickly; leaflets obtuse at apex, 1–1.5 in. long, .5–.75 in. broad; flowers small, in short dense panicles; fruit as in 2 3. *obtusifolia*.

Variety 1 is found in forests in almost all Districts, and is conspicuous by the corky protuberances bearing spines on the stems; variety 2 occurs in dry Districts, chiefly in the Circars and Carnatic; variety 3 is only found in the Nilgiris at about 6,000 ft.

5. *Vepris*, Comm.

Trees or shrubs, unarmed. *Leaves* alternate, 1–3-foliolate, the leaflets usually petiolulate, gland-dotted. *Flowers* small, in terminal or axillary panicles. *Calyx* small, saucer-shaped, 2- or more-lobed. *Petals* 2–4, lanceolate or ovate, more or less imbricate. *Stamens* in ♂ flowers twice or three times as many as the petals, inserted under the disk, filaments slender, anthers ovate; in ♀ flowers reduced to minute staminodes with small rudimentary anthers. *Ovary* in ♂ flowers small, ovoid, 2-cleft at apex: in ♀ flowers globose, 2–4-celled; styles 0; stigma capitate; ovules in each cell 2, collateral. *Fruit* globose or oblong, 2–4-celled, fleshy. *Seeds* one in each cell, flattened, oblong, testa crustaceous; albumen fleshy; embryo flat, cotyledons thick, ovate; radicle stout.

VEPRIS BILOCULARIS, Engl. *Toddalia bilocularis*, W. & A. 149; F. B. I. i. 497; Bedd. Ic. t. 167.

A large handsome evergreen tree with trifoliolate leaflets up to 9 in. long and about 3 in. broad, with many close parallel nerves and an intramarginal nerve; petals 3; stamens 6; fruit oblong, .5 in. long, 2-celled.

Forests of Malabar, the Anamalais and Travancore, up to 4,000 ft.

6. *Acronychia*, Forst.

Trees. *Leaves* opposite or alternate, 1- rarely 3-foliolate; leaflets entire, pellucid-punctate. *Flowers* polygamous, in axil-

lary or terminal cymes or corymbs. *Calyx* 4-lobed, lobes imbricate. *Petals* 4, spreading, valvate. *Disk* thick, 8-angled, tomentose. *Stamens* 8, inserted under the disk, filaments subulate, the alternate ones longer. *Ovary* 4-celled, inserted on the hollowed top of the disk; style terminal; stigma 4-grooved; ovules 2 in each cell, superposed. *Fruit* a 4-celled drupe or 4-valved loculicidal capsule. *Seeds* 1-2 in each cell; testa black; albumen copious; embryo straight; cotyledons oblong, flat.

Branchlets rather stout, grey; leaflet 3-9 in. long, thick; flowers in rather stout long-pedunculate corymbs, 4-6 in. long; petals 2 in. long, the base inside with white retrorse hairs 1. *laurifolia*.

Branchlets slender, reddish; leaflet 1-3 in. long, thin; flowers in slender panicles of cymes under 1 in. long; petals under 2 in. long, nearly glabrous within 2. *Barberi*.

1. *ACRONYCHIA LAURIFOLIA*, Blume; F. B. I. i. 498. *Cyminosma pedunculata*, DC.; W. & A. 147; Wt. Ill. i. t. 65.

N. Circars in the Hills of Vizagapatam; S. Deccan slopes in Salem; W. Gháts, common in hill forests up to 6,000 ft.

A small evergreen tree, drupes subglobose, apiculate. Wood greyish-white, smooth. Vern. *Tam.* Mutta nári; *Mal.* Vidu Kanalei.

2. *ACRONYCHIA BARBERI*, Gamble in Kew Bull. 1915, 345. *A. laurifolia* var. 4; F. B. I. i. 498.

Anamalai Hills of Coimbatore (Barber); Pulneys (Wight).

7. *Chloroxylon*, DC.

A deciduous tree. *Leaves* pinnate; leaflets numerous, very oblique, entire, gland-dotted. *Flowers* small, in terminal and axillary pubescent panicles. *Calyx* short, 5-lobed. *Petals* 5, clawed, imbricate. *Disk* thick, 10-lobed, pubescent. *Stamens* 10, free, inserted between the lobes of the disk. *Ovary* pubescent, sunk in the disk, 3-lobed, 3-celled; style short, slender, glabrous; stigma capitate; ovules 8 in each cell. *Fruit* an oblong, 3-celled, loculicidal capsule. *Seeds* about 4 in each cell, imbricate, compressed, winged especially above, their margins angular, attached to the edges of the septa; albumen 0; cotyledons fleshy, flattened; radicle short.

CHLOROXYLON SWIETENIA, DC.; F. B. I. i. 569; W. & A. 123;

Wt. Ill. i. t. 56 bis; Bedd. Fl. t. 11. *Swietenia Chloroxylon*, Roxb. Cor. Pl. i. t. 64.

N. Circars (common and of large size) and Deccan in dry deciduous forests, less common in the Carnatic, usually on poor soil like laterite. Satin wood.

A conspicuous and pretty tree with rough yellowish corky bark and yellow close-grained wood valuable for furniture and turnery. Vern. Hind. Bhera; Ur. Bheru; Tel. Billu; Tam. Purush.

8. *Glycosmis*, Correa.

Unarmed shrubs or small trees. *Leaves* 1-foliate or imparipinnate; leaflets alternate. *Flowers* small, in axillary rarely terminal panicles. *Calyx* 4-5-lobed; lobes broad, imbricate. *Petals* 4-5, imbricate. *Stamens* 8-10, free, inserted round a disk; filaments flat; anthers small, usually with an apical or dorsal gland. *Ovary* seated on the disk, 2-5-celled; style short, persistent; stigma capitate; ovules 1 in each cell, pendulous. *Fruit* a dry or pulpy berry, 1-3-seeded. *Seeds* globose, usually depressed, testa membranous; albumen 0; cotyledons thick fleshy, hemispheric; embryo very small, villous.

GLYCOSMIS COCHINCHINENSIS, Pierre. *G. pentaphylla*, Correa; F. B. I. i. 499; W. & A. 93. *G. arborea*, DC.; W. & A. 92. *G. triphylla*, Wt. Ic. t. 167; W. & A. 93. *Limonia pentaphylla*, Roxb. Cor. Pl. i. t. 84. *L. arborea*, Roxb. l.c. t. 85.

In all Districts, common, especially as undergrowth of forests, of mango groves, and of hedgerows near villages.

Usually a shrub, occasionally a small tree, very variable in leaves, flowers and fruit. Leaves usually with 3-5 leaflets, but 1 only not rare, the leaflets often are large, up to 9 in. long, sometimes again they are quite small. Many varieties exist, but all are more or less connected by intermediates. Vern. Hind. Ban nimbu; Tel. Gonji; Tam. Kula pannai; Mal. Pánal.

9. *Micromelum*, Blume.

Unarmed trees. *Leaves* imparipinnate; leaflets alternate, oblique. *Flowers* in large terminal corymbose panicles. *Calyx* cupshaped, 3-5-lobed. *Petals* 5, free, thick, valvate or subimbricate. *Disk* short, stipitiform. *Stamens* 10, free, inserted at the base of the disk; filaments linear-subulate, alternately shorter

and longer. *Ovary* seated on the disk, 5-, rarely 2-6-celled; style thick, articulate; deciduous; stigma capitate or obtuse; ovules 2 in each cell, superposed. *Fruit* a 1-2-seeded berry, septa spirally twisted. *Seeds* oblong; testa membranous; albumen 0; cotyledons leafy, much crumpled; radicle long.

MICROMELUM PUBESCENS, Blume; F. B. I. i. 501.

N. Circars, Hills of Ganjam and Vizagapatam (Beddome, Barber).

A small tree with pinnate leaves up to 18 in. long and distant pinnules very unequal at base. Wood yellowish-white, hard and close-grained.

40. *Clausena*, Burm.

Unarmed shrubs or trees. *Leaves* imparipinnate; leaflets alternate, glandular-dotted, usually crenate. *Flowers* small, in terminal or axillary cymes panicles or compound racemes. *Calyx* 4-5-lobed. *Petals* 4-5, free, membranous, imbricate, gland-dotted. *Disk* elongated. *Stamens* 8-10, inserted round the disk; filaments dilated below the tip, alternately longer and shorter; anthers rather large, usually glandular on the back. *Ovary* 4-5- (rarely 2-3-) celled; style thick, articulate, deciduous; stigma obtuse, entire or lobed; ovules 2 in each cell, collateral or superposed. *Fruit* an oblong or globose berry, 2-5-celled, pericarp very glandular. *Seeds* oblong; testa membranous; albumen 0; cotyledons equal, plano-convex; embryo minute.

Ovary glabrous:—

Flowers usually 5-merous; *ovary* with conspicuous glandular papillae:—

Inflorescence terminal, paniculate with corymbose branches up to 5 in. long; leaflets membranous, rhomboid, oblique, nearly black when dry, with raised glands, reticulation obscure; ovules collateral

1. *indica*.

Inflorescence subterminal or axillary in thyrsoid panicles up to 8 in. long; leaflets chartaceous, lanceolate to obovate, yellowish when dry with immersed glands, reticulation conspicuous; margins often crenate; ovules superposed

2. *heptaphylla*.

Flowers 4-merous; *inflorescence* axillary, in slender compound racemes up to 4 in. long; leaflets membranous, ovate-lanceolate, oblique, greenish when dry and profusely glandular dotted; *ovary* with obscure glands; ovules superposed

3. *Willdenovii*.

Ovary hirsute; leaves and inflorescence pustular; flowers 4-5-merous
Wampi.

1. *CLAUSENA INDICA*, Oliver; F. B. I. i. 505.

W. Gháts, in evergreen forests of the Anamalais and Travancore at 3,000 to 5,000 ft., not common.

2. *CLAUSENA HEPTAPHYLLA*, W. & A. 95 (in note); F. B. I. i. 504.

N. Circars, Hills of Ganjam and Vizagapatam to 5,000 ft.; W. Gháts in Wynaad, Malabar, Anamalais, Pulneys and Travancore at 3,000 to 5,000 ft.

A branching bush or small tree, strongly aromatic.

3. *CLAUSENA WILLDENOVII*, W. & A. 96; Wt. Ic. t. 14; F. B. I. i. 506. *C. pubescens*, W. & A. 96.

Carnatic, in Chingleput, S. Arcot, Pudukota and Tanjore; Shevaroy Hills of Salem; W. Gháts from Mysore through Nilgiris to Travancore at low levels.

A small tree with glabrous or pubescent leaves, black bark and white close-grained wood. The fruit is good and worth cultivation. Vern. Tam. Potti.

C. Wampi, Blanco, is a Chinese species cultivated for its orange-flavoured small fruit.

11. *Murraya*, Linn.

Shrubs or small trees, unarmed. *Leaves* pinnate; leaflets alternate, petiolulate, oblique or cuneate at base. *Flowers* solitary, axillary or in terminal corymbs or axillary cymes. *Calyx* 5-lobed. *Petals* 5, free, imbricate. *Disk* stipitiform. *Stamens* 10, inserted outside the disk; filaments linear-subulate, alternately shorter and longer; anthers small. *Ovary* seated on the disk, 2-5-celled; style elongate, articulate, deciduous; stigma capitate; ovules solitary or 2 superposed in each cell. *Fruit* a 1-2-celled berry, oblong or ovoid. *Seeds* with a woolly or glabrous testa; albumen 0; cotyledons thick, plano-convex; embryo small.

Flowers few, rather large, axillary; petals 5 in. long; leaflets 3-7; berry red 1. *exotica*.

Flowers many; in terminal corymbs; petals 2 in. long; leaflets 10-20; berry black 2. *Königii*.

1. *MURRAYA EXOTICA*, Linn.; F. B. I. i. 502; W. & A. 94; Wt. Ic. t. 96.

In almost all Districts, especially in the hills; common in underwood and especially in ravines; often planted in gardens.

A large shrub or small tree with scented flowers. Wood very hard, resembling boxwood. Vern. *Hind.* Marchula; *Tel.* Naga golunga.

2. MURRAYA KÖNIGII, Spreng.; F. B. I. i. 503. *Bergera Königii*, Linn.; W. & A. 94; Wt. Ic. t. 13.

In most Districts, chiefly in the N. Circars and Deccan, less frequent on the W. Coast, but nowhere very common. A small tree with very aromatic leaves which are eaten in curries. Wood greyish-white, softer than that of the last. Vern. *Hind.* Katnim; *Tel.* Karepaku; *Tam.* Karivempu, Kátta veppilei; *Kan.* Kari bévu.

12. *Triphasia*, Lour.

A shrub, armed with strong straight spines. *Leaves* alternate, sessile, 3-foliolate; leaflets small, obtuse, crenate, the lateral ones smaller than the terminal. *Flowers* solitary or in 2-3-flowered cymes, axillary, sweet-scented. *Calyx* 3-lobed. *Petals* 3, free, imbricate, oblong. *Disk* fleshy. *Stamens* 6, free, inserted round the disk; filaments long, subulate, dilated below; anthers oblong. *Ovary* seated on the disk, ovoid-oblong, narrowed into the articulate style; stigma capitate, 3-lobed; cells 3; ovules 1 in each cell. *Fruit* an ovoid fleshy gland-dotted berry 1-3-celled and -seeded. *Seeds* ovoid-oblong, immersed in mucilage; testa coriaceous; albumen 0; cotyledons flattened, plano-convex, often unequal or lobed; embryo minute.

TRIPHASIA AURANTIOLA, Lour. *T. trifoliata*, DC.; F. B. I. i. 507; W. & A. 91.

Cultivated and found run wild as at Madras and Cochin; apparently introduced from China.

13. *Limonia*, Linn.

Shrubs or small trees, often armed with spines. *Leaves* alternate, 3-foliolate or imparipinnate with usually opposite leaflets; petiole and rhachis winged. *Flowers* in fascicles racemes or panicles. *Calyx* 4-5-lobed or partite. *Petals* 4-5, imbricate. *Disk* annular or stipitiform. *Stamens* 8-10, free, subequal, inserted round the disk; filaments subulate; anthers cordate or

linear-oblong. *Ovary* oblong, 4-5-celled; style short, thick, articulate; stigma obtuse or capitate; ovules 1-2 in each cell. *Fruit* a globose 1-4-celled and -seeded berry. *Seeds* ovoid or flattened, imbedded in mucilage; albumen 0; cotyledons fleshy, plano-convex.

Leaves trifoliate; leaflets obovate, entire, cuneate at base, up to 2.5 in. long; flowers 4-5-merous, in terminal or axillary panicles; ovary cells 2-ovuled; berry 1 in. in diam. 1. *alata*.

Leaves imparipinnate; leaflets 2-4 pair, sessile, opposite, crenulate, up to 2 in. long, rhachis broadly winged; flowers 4-merous, in racemes 1 in. long; ovary cells 1-ovuled; berry under .5 in. in diam. ...2. *crenulata*.

1. LIMONIA ALATA, W. & A. 92; Wt. Ill. i. 41; F. B. I. i. 308.

Deccan and Carnatic from the Kistna southwards, in evergreen forests; E. side of W. Gháts at the foot of the hills from Coimbatore to Tinnevely.

A shrub or small tree, scarce. Wood hard and close-grained.

2. LIMONIA CRENULATA, Roxb., Cor. Pl. i. t. 86. *L. acidissima*, W. & A. 92; F. B. I. i. 507, not of Linn.

N. Circars, Deccan and Carnatic, common in dry forests.

A small thorny tree, in favourable places reaching a good size. Wood yellowish-white, very hard, like boxwood. Vern. *Hind.* Beli; *Ur.* Bhenta; *Tel.* Tor-elaga.

14. Luvunga, Ham.

Climbing shrubs, armed with axillary spines. *Leaves* 3-foliate; leaflets coriaceous, entire. *Flowers* in axillary fascicled racemes or panicles. *Calyx* cupular, entire or obscurely 4-6-lobed. *Petals* 4-5, free, thick, imbricate. *Disk* elevated, annular or cupular. *Stamens* 8-10, inserted round the disk; filaments free, equal or subequal, linear; anthers linear or linear-oblong. *Ovary* 2-4-celled; style stout, articulate, deciduous; stigma capitate; ovules 2 in each cell, superposed. *Fruit* a large ellipsoid berry, 1-3-seeded, rind thick. *Seeds* large, ovoid; testa membranous; albumen 0; cotyledons oblong, fleshy.

LUVUNGA ELEUTHERANTRA, Dalz.; F. B. I. i. 509.

A climber with strong sharp usually deflexed spines, thick leaflets, 4-merous flowers and large fruit pitted with glands.

W. Gháts from S. Canara and Mysore to Anamalais and Travancore up to 3000 ft. in evergreen forests.

15. *Paramignya*, Wight.

Shrubs, erect or climbing, unarmed or with axillary spines. *Leaves* 1-foliolate, entire, subcoriaceous. *Flowers* rather large, axillary, solitary or fascicled. *Calyx* cupular or small and 4-5-lobed. *Petals* 4-5, free, imbricate or rarely valvate. *Disk* thick, columnar. *Stamens* 8-10, free; filaments linear, equal or subequal, inserted round the disk, usually hairy; anthers linear-oblong. *Ovary* 3-5-celled; style elongate, articulate, deciduous; stigma capitate; ovules in each cell 1 or 2 obliquely superposed. *Fruit* an ovoid or subglobose berry, often contracted at base; 1-5-seeded; rind thick. *Seeds* large, oblong, compressed; testa membranous; cotyledons fleshy, equal.

Leaflets ovate-oblong or elliptic, obtuse or acute at apex, rounded at base, 2-5 in. long, 1-2 in. broad; calyx 5-lobed, pubescent; pedicels rather stout:—

Calyx cupular with broad lobes; petals thick, very imbricate, 4-5 in. long 1. *monophylla*.

Calyx small with acute lobes; petals thin, induplicate-valvate, 3 in. long 2. *Griffithii*.

Leaflets ovate or ovate-lanceolate, acuminate at apex, rounded at base, 2-3 in. long, 1-1.5 in. broad; calyx with 4 minute teeth, glabrous; pedicels long slender 3. *armata*.

1. *PARAMIGNYA MONOPHYLLA*, Wt. Ill. i. 109, t. 42; F. B. I. i. 510.

N. Circars, Hills of Ganjam, Rumpa Hills up to 3,000 ft. or more; W. Gháts from S. Canara to Tinnevely up to 6,000 ft., thorny climber.

2. *PARAMIGNYA GRIFFITHII*, Hook. f.; F. B. I. i. 510.

E. Gháts in Madgol Hills of Vizagapatam 4,000 ft. (A. W. Lushington), thorny climber.

3. *PARAMIGNYA ARMATA*, Oliv.; F. B. I. i. 511; Bedd. Ic. t. 275.

W. Gháts in Wynaad, Atapadi Hills of Malabar, Hills of Tinnevely, thorny climber.

16. *Atalantia*, Correa.

Evergreen shrubs or trees, armed or unarmed. *Leaves* alternate, 1-foliolate; leaflet coriaceous, entire or crenulate; stipule-like scales often present, representing undeveloped leaf-buds. *Flowers* in axillary, rarely terminal, fascicles racemes or panicles, rarely

solitary. *Calyx* 3-5-lobed or -partite, sometimes irregularly split. *Petals* 3-5, free or adnate to the stamens and united with them in a tube, imbricate. *Disk* annular or cupular. *Stamens* 6-8 (rarely 15-20) inserted outside the disk; filaments free or connate in a tube, subequal or the alternate shorter; anthers short, ovate-oblong or cordate (linear-oblong in *A. missionis*). *Ovary* 2-4- (rarely 3-5-) celled; style stout, articulate, deciduous; stigma capitate; ovules 1 or 2 in each cell, if 2 collateral. *Fruit* a large subglobose berry with thick rind, 1-5-celled and -seeded. *Seeds* ovoid or oblong; testa membranous; albumen 0; cotyledons fleshy, plano-convex, sometimes unequal.

Stamens usually combined in a tube; leaflet emarginate:—

Calyx irregularly lobed; flowers in umbels or corymbs; leaflet ovate, obtuse, 1-3 in. long.....1. *monophylla*.

Calyx regularly lobed; flowers in racemes; leaflet elliptic, obtusely acute, 2-4 in. long 2. *racemosa*.

Stamens free:—

Leaves with conspicuous reticulation and prominent parallel main nerves (12-14 pairs) olive-green when dry, emarginate; filaments flat; anthers cordate; flowers in short cymes 3. *ceylanica*.

Leaves with inconspicuous reticulation and main nerves (8-10 pairs), dull greyish-brown when dry, not emarginate; filaments dilated below only; anthers linear-oblong; flowers in racemes, 1-2 in. long. 4. *missionis*.

1. *ATALANTIA MONOPHYLLA*, Correa; F. B. I. i. 511; W. & A. 91. *A. floribunda*, Wt. Ic. t. 1611. *Limonia monophylla*, Linn.; Roxb. Cor. Pl. i. t. 82.

N. Circars, Deccan and Carnatic in dry forests in almost all Districts; W. Coast and W. Gháts, scarce.

A small thorny tree with yellowish very hard close-grained wood, of boxwood character. Vern. *Ur.* Kata narunga; *Tel.* Yerra munukudu; *Tam.* Katta naragam.

2. *ATALANTIA RACEMOSA*, W. & A. 91; F. B. I. i. 512. *Sclerostylis parvifolia*, Wt. Ic. t. 71.

Hills of the Deccan, Nandidrüg in Mysore, Horsley Konda in Cuddapah, etc., up to 4,000 ft.; W. Gháts, chiefly on eastern side from Mysore to Travancore, up to 3,000 ft.

A small thorny tree, resembling No. 1, but with shorter staminal tube and leaves often crenulate. Vern. *Tam.* Katta naragam.

3. *ATALANTIA CEYLANICA*, Oliv.; F. B. I. i. 512.

W. Gháts in Wynnaad, Malabar, Nilgiris, Anamalais and Travancore, up to 5,000 ft.

A small thorny tree or branching shrub, not common.

4. *ATALANTIA MISSIONIS*, Oliv.; F. B. I. i. 513. *Limonia missionis*, Wt. Ic. t. 175; W. & A. 92.

Deccan Hills in Chingleput, Cuddapah, etc.; also E. slopes of Nilgiris and Anamalais; W. Coast, Quilon in Travancore.

A small very thorny *Citrus*-like tree with yellowish-white hard wood. Vern. *Tam.* Kuruntu.

17. *Feronia*, Gaertn.

A tree, armed with spines. *Leaves* alternate, imparipinnate; leaflets opposite, subsessile, entire; petiole and rachis winged or not. *Flowers* polygamous, in terminal or lateral racemes or panicles. *Calyx* small, flat, 5-toothed, deciduous. *Petals* 5, rarely 4 or 6, imbricate, spreading. *Disk* short. *Stamens* 10-12, a few sometimes imperfect, inserted round the disk; filaments dilated below, villous on face and margins, slender above; anthers linear-oblong. *Ovary* oblong, 5-6-celled, at length 1-celled; style 0; stigma oblong, fusiform, deciduous; ovules numerous, many-seriate, crowded on the at length parietal placentas. *Fruit* a large, globose, 1-celled, many-seeded berry with rough woody rind. *Seeds* oblong, compressed, imbedded in pulp; albumen 0; cotyledons thick, fleshy.

FERONIA ELEPHANTUM, Corr.; F. B. I. i. 516; W. & A. 96; Wt. Ic. t. 15; Roxb. Cor. Pl. ii. t. 141; Bedd. Fl. t. 121.

N. Circars, Deccan and Carnatic, in dry open forests, often cultivated both there and on W. Coast. The Wood-apple.

A small deciduous spiny tree with yellowish-white hard wood. The pulp of the fruit is much eaten. Vern. *Hind.* Kat-bél; *Ur.* Koito; *Tel.* Velaga; *Tam., Mal.* Vila, Vilatti; *Kan.* Bilwar.

18. *Aegle*, Corr.

Trees, armed with spines. *Leaves* alternate, 3-foliolate; leaflets membranous, subcrenulate, glabrous or pubescent. *Flowers* hermaphrodite, rather large, white, in axillary panicles. *Calyx* small, 4-5-lobed, deciduous. *Petals* 4-5, oblong, imbricate, spreading. *Disk* inconspicuous. *Stamens* numerous (80-60) inserted round the disk; filaments subulate; anthers elongate, erect. *Ovary* ovoid,

8-20-celled, the cells peripheral round a thick axis; style short; stigma oblong, fusiform, deciduous; ovules numerous, 2-seriate in each cell. *Fruit* a large, globose or ovoid, 8-15-celled, berry, the cells many-seeded, the rind smooth, woody. *Seeds* numerous, imbedded in aromatic pulp, oblong, compressed; albumen 0; cotyledons thick, fleshy.

ÆGLE MARMELOS, Corr.; F. B. I. i. 516; W. & A. 96; Wt. Ic. t. 16; Roxb. Cor. Pl. ii. t. 143; Bedd. Fl. t. 161.

N. Circars, Deccan and Carnatic, in dry forests; W. Coast, run wild; often cultivated. The Bael tree.

A small deciduous thorny tree, the leaves usually glabrous, but grey-pubescent in the more arid localities. Wood yellowish-white, hard. The fruit is valued for its aromatic pulp and its medicinal use. Vern. *Hind.* Bēl; *Ur.* Baelo; *Tel.* Maredu; *Tam.* Vilva; *Mal.* Kovalam.

19. Citrus, Linn.

Evergreen shrubs or trees, usually armed with spines. *Leaves* alternate, 1-foliolate, coriaceous; petiole often winged; leaflets entire or crenulate; stipules 0. *Flowers* axillary, solitary fascicled or in small cymes. *Calyx* cupular or urceolate, 3-5-lobed. *Petals* 4-8, linear-oblong, thick, imbricate. *Disk* large, cupular or annular. *Stamens* numerous (20-60), inserted round the disk; filaments irregularly polyadelphous, compressed at the base; anthers oblong. *Ovary* many-celled; style stout, deciduous; stigma capitate; ovules 4-8 in each cell, 2-seriate. *Fruit* a large berry, oblong or globose, fleshy, many-celled; septa membranous; cells few-seeded and filled with transverse fusiform cells filled with juice, the rind leathery. *Seeds* horizontal or pendulous; testa coriaceous or membranous; albumen 0; cotyledons plano-convex, often unequal; radicle small, superior.

CITRUS MEDICA, Linn.; F. B. I. i. 514.

N. Circars, in Ganjam and Vizagapatam up to 3,000 ft., usually in thickets along streams; W. Ghāts of Coorg, Malabar, Nilgiris and N. Travancore up to 4,000 ft.

A small tree with elliptic-oblong obtuse crenulate leaflets, apparently quite wild. There are 4 cultivated varieties of this species: (1) *medica* proper, the Citron; (2) *Limonum*, the Lemon; (3) *acida*, the sour Lime; and (4) *Limetta*, the sweet Lime.

Citrus Aurantium, Linn., the Orange, and *C. decumana*, Linn., the Pumelo, or Shaddock, are also much cultivated, the former frequently found run wild.

Family XXXV. SIMARUBACEAE.

Trees or shrubs, usually with bitter bark and sometimes wood. *Leaves* alternate, pinnate, rarely simple; stipules 0 or deciduous. *Flowers* regular, small, 1-sexual or polygamous rarely hermaphrodite, in axillary cymes racemes or panicles. *Calyx* 3-5-lobed. *Petals* 3-5, rarely 0, valvate or imbricate. *Disk* annular or elongated, simple or lobed, rarely 0. *Stamens* as many as or twice as many as the petals, rarely indefinite, inserted at the base of the disk; filaments free, often with a scale at the base; anthers oblong, usually introrse, dehiscing longitudinally. *Ovary* free, 1-6-celled, usually deeply lobed; styles 2-5, free or united; stigmas capitate plumose or minute; ovules usually 1 in each cell. *Fruit* usually of 2-6 distinct carpels, sometimes samaroid sometimes indehiscent drupaceous. *Seeds* usually solitary, erect or pendulous; albumen fleshy scanty or 0; cotyledons plano-convex or flat; radicle superior.

Ovary deeply divided:—

- Leaves pinnate; fruit samaroid; large trees 1. **Ailanthus.**
- Leaves simple; fruit drupaceous, winged, small trees...2. **Samadera.**
- Ovary entire; leaves 2-foliolate, small; flowers small, green, fruit a large one-seeded drupe; small thorny trees 3. **Balanites.**

1. *Ailanthus*, Desf.

Tall trees. *Leaves* very large, alternate, imparipinnate; leaflets alternate or subopposite, unequal-sided. *Flowers* small, polygamous, in terminal or axillary branched panicles, bracteolate. *Calyx* short, 5-lobed. *Petals* 5-6, valvate. *Disk* 10-lobed. *Stamens* in ♂ flowers 10-12, in ♀ fewer, in ♀ wanting, inserted at the base of the disk; filaments short or filiform; anthers ovate or oblong, introrsely or laterally dehiscing. *Ovary* in ♂ rudimentary, in others 2-5-celled, the carpels compressed, more or less distinct; styles from below the apex connate above; stigmas plumose; ovule 1 in each cell, semianatropous. *Fruit* of 1-5, single-seeded, oblong samaras with large membranous wings. *Seed* pendulous, compressed; testa membranous; albumen very scanty or 0; cotyledons flat, fleshy; radicle small, superior.

Leaflets coarsely toothed, very tomentose when young; petals usually reflexed; filaments shorter than the oblong anthers; samara narrow, twisted 1. *excelsa*.
 Leaflets entire, glabrous; petals erect; filaments longer than the ovate cordate anthers; samara broad, not twisted 2. *malabarica*.

1. *AILANTHUS EXCELSA*, Roxb. Cor. Pl. i. 24, t. 23; F. B. I. i. 518; W. & A. 150; Wt. Ill i. t. 67.

N. Circars, forests of Ganjam and Vizagapatam; scarce in Deccan and Carnatic; often planted.

A beautiful tree with rough bark and soft white wood, used for catamarans and sword-sheaths. Vern. *Hind.* Maharukh; *Ur.* Mahanim; *Tel.* Peddamán; *Tam.* Peru.

2. *AILANTHUS MALABARICA*, DC.; F. B. I. i. 518; W. & A. 150; Wt. Ic. t. 1604; Bedd. Fl. t. 122.

W. Gháts from S. Canara and Mysore to Travancore, up to 3,000 ft., often planted.

A lofty deciduous tree with grey rough bark and soft white wood. Vern. *Kan.* Dhúp; *Tam.* Peru; *Mal.* Pongiyam, Mattipál.

2. *Samadera*, Gaertn.

Small glabrous trees. *Leaves* alternate, simple, oblong, coriaceous, shining, with 2 glands at the base. *Flowers* hermaphrodite, in axillary or terminal long-peduncled umbels. *Calyx* small, 3-5-lobed, imbricate. *Petals* 3-5, coriaceous, elongate, imbricate. *Disk* large, obconic. *Stamens* 6-10, with short basal scales; filaments slender, twisted; anthers oblong. *Ovary* of 4-5 distinct free carpels; styles free at the base, more or less united above; stigmas acute; ovule 1 in each cell, pendulous. *Fruit* of 1-5 large dry compressed drupes with a narrow wing. *Seed* solitary; testa membranous; cotyledons plano-convex, fleshy; radicle very short.

SAMADERA INDICA, Gaertn.; F. B. I. i. 519; W. & A. 151; Wt. Ill. t. 68.

W. Coast in evergreen forests and along backwaters in Malabar and Travancore.

A small tree with elliptic-oblong shining leaves reaching 10 in. by 3-4 in., large smooth red fruit and light yellow soft bitter-tasting wood. Vern. *Mal.* Karingotta.

3. *Balanites*, Delile.

Small trees or shrubs armed with strong sharp spines, often ending arrested branchlets. *Leaves* alternate, 2-foliolate; leaflets entire. *Flowers* small, green, fragrant, in axillary cymes. *Sepals* 5, imbricate, deciduous. *Petals* 5, oblong, spreading, imbricate. *Disk* thick, conical, 10-grooved, hollowed at the apex. *Stamens* 10, inserted in the furrows at the base of the disk; filaments slender, subulate; anthers inserted at the back. *Ovary* entire, globose, 1-celled; style short; stigmas minute; ovules 1 in each cell, pendulous from below the apex. *Fruit* a large fleshy oily 1-seeded drupe, putamen bony, 5-angled, 1-seeded. *Seed* pendulous; testa fibrous; albumen 0; cotyledons thick, oblong, plano-convex; radicle superior.

BALANITES ROXBURGHII, Planch.; F. B. I. i. 522. *B. aegyptiaca*, Wt. Ic. t. 274.

N. Circars in Vizagapatam; Deccan, common in Hyderabad, Ceded Districts and Mysore, in dry forests, characteristic also of black-cotton soils.

A small tree with ashy-grey foliage, grey bark and yellowish-white wood of peculiar structure. Vern. *Hind.* Hingu; *Tel.* Gari; *Tam.* Nanjunda.

Family XXXVI. OCHNACEAE.

Trees or shrubs. *Leaves* alternate, glabrous, simple or rarely pinnate; stipules 2. *Flowers* regular, hermaphrodite, conspicuous, in racemes panicles or umbels rarely solitary, terminal axillary or on short lateral branchlets. *Sepals* 4-5, free, imbricate, persistent. *Petals* 5, rarely 4-10, free, deciduous, imbricate. *Disk* thick, enlarged in fruit, sometimes 0. *Stamens* 4, 5, 8, 10 or indefinite, inserted at the base of the disk; anthers dehiscing longitudinally or by terminal pores. *Ovary* short and 2-celled or elongate and 1-10-celled; placentas axile or parietal; styles simple, subulate, straight or incurved; stigmas terminal; ovules 1-2 in each cell or indefinite, erect or rarely pendulous. *Fruit* indehiscent, drupaceous or baccate, each drupe or pyrene 1-4-seeded, or capsular and 1-5-celled with septicidal dehiscence. *Seeds* solitary or few, rarely numerous; albumen fleshy or 0; embryo usually straight.

Stamens indefinite anthers opening longitudinally 1. *Ochna*.

Stamens 10, anthers opening by terminal pores 2. *Ouratea*.

1. *Ochna*, Linn.

Trees or shrubs, glabrous. *Leaves* alternate, simple, usually serrate or crenate, shining, many-nerved; stipules 2. *Flowers* conspicuous, yellow, bracteate, in racemes panicles or umbels, from the ends of short woody branches. *Sepals* 5 imbricate, persistent, coloured. *Petals* 5-10, imbricate, deciduous. *Disk* thick, lobed. *Stamens* numerous, shorter than the petals, inserted at the base of the disk; filaments persistent; anthers linear, dehiscing longitudinally, deciduous. *Ovary* deeply 3-10-lobed, lobes 1-celled; styles basal, connate or sometimes free at the apex; stigmas simple or capitate; ovule 1 in each cell, axile. *Fruit* of 3-10 distinct drupes seated on the enlarged disk. *Seed* erect, oblong; testa membranous; albumen 0; cotyledons thick, plano-convex; radicle minute.

Flowers large :—

Flowers in axillary or lateral racemes; trees :—

Leaves closely nerved, serrate or shortly crenate :—

Leaves membranous or chartaceous, green, lanceolate or obovate, acute at apex, shortly petioled, distant on the branchlets not tufted; stigmas simple, minute 1. *squarrosa*.

Leaves coriaceous, glaucous, obovate, obtuse at apex, cordate at base, nearly or quite sessile; tufted at the ends of the branchlets; stigmas in a lobed head 2. *Gamblei*.

Leaves coarsely and irregularly nerved, broadly crenate, oblong or obovate-oblong, obtuse at apex; pedicels long, slender; stigmas minute 3. *Beddomei*.

Flowers in subterminal umbels; dwarf shrubs with oblanceolate coarsely-nerved leaves up to 6 in. long; styles free at apex 4. *pumila*.

Flowers small, solitary or in racemes of 2-3 flowers, axillary or lateral; leaves subcoriaceous :—

Leaves elliptic or ovate, obtuse, subcordate, with conspicuous close nerves, under 1.5 in. long; styles scarcely free at apex; stigmas minute.....5. *Wightiana*.

Leaves oblong-lanceolate, acute at both ends, with inconspicuous nerves, 2-3 in. long; style free at apex with peltate stigmas

6. *Heyneana*.

1. *OCHNA SQUARROSA*, Linn.; F. B. I. i. 523; Roxb. Cor. Pl. i. t. 89; Wt. Ill. i. t. 69.

N. Circars, common in Ganjam and Vizagapatam; Deccan

and Carnatic, less common, but widespread from Hyderabad to Tinnevely in fairly damp places.

A small tree with thin brown bark and reddish-brown wood of pretty grain, conspicuous for its yellow flowers with persistent sepals. Vern. *Tel.* Sunari; *Tam.* Chilanti; *Kan.* Narole.

2. *OCHNA GAMBELI*, King; Brandis Ind. Trees 128.

Deccan and Carnatic, in dry places and on rocky hills in Hyderabad, the Ceded Districts and Hills of Chingleput; W. Coast at Quilon in Travancore (*Wight*—small-leaved var.).

A small tree with thick bark and reddish wood, conspicuous for its tufted very glaucous leaves and large yellow flowers. Vern. *Tel.* Kuka-moi.

3. *OCHNA BEDDOMEI*, Gamble in Kew Bull. 1916, ined.

Forests of Kurnool Cuddapah and Mysore, apparently scarce; perhaps also in N. Circars.

A small tree (?), but little known.

4. *OCHNA PUMILA*, Ham.; F. B. I. i. 524.

Madras Presidency (Beddome), perhaps S. Canara.

A dwarf undershrub with perennial rootstock, throwing up annually, usually after jungle fires, shoots with large bright yellow flowers.

5. *OCHNA WIGHTIANA*, Wall.; Wt. Ic. t. 226 (as to description only except stigma); W. & A. 152; F. B. I. i. 524, in part. Travancore (*Wight*); Dimbham Ghát, Coimbatore (A. W. Lushington).

A shrub or small tree with small coriaceous leaves and small flowers in racemes of 1-3 together.

6. *OCHNA HEYNEANA*, W. & A. 152. *O. Wightiana*, Wt. Ic. t. 223 (plate only).

W. Gháts, Hills of Tinnevely and Travancore.

A small tree with oblong-lanceolate leaves and small flowers. Vern. *Tam.* Silimbi.

2. *Ouratea*, Aubl.

Small trees, glabrous. Leaves alternate, simple, coriaceous, shining, many-nerved, finely serrate; stipules 2. Flowers yellow, in axillary or terminal racemes or umbels. Sepals 5, usually coloured, persistent. Petals 5, imbricate. Disk thick, lobed.

Stamens 10, inserted at the base of the disk; filaments very short; anthers linear, dehiscing by terminal extrorse pores. *Ovary* deeply 5-6-lobed, lobes 1-celled; styles basal, connate; stigmas simple; ovule 1 in each cell, erect. *Fruit* of 5 or fewer distinct drupes seated on the enlarged disk. *Seed* erect; testa membranous; albumen 0; cotyledons fleshy, plano-convex; radicle very short.

OURATEA ANGUSTIFOLIA, Gilg. *Gomphia angustifolia*, Vahl; F. B. I. i. 525; W. & A. 152.

W. Coast and lower slopes of W. Gháts from S. Canara to Tinnevely, up to 3,000 ft., in evergreen forests.

A small tree with shining leaves and an intramarginal nerve; drupes reniform, reticulate; wood reddish-brown, even-grained, hard. Vern. Tam. Ramanchi; Mal. Chavakampu.

Family XXXVII. BURSERACEAE.

Trees or shrubs with balsaminous juice. *Leaves* alternate, very rarely opposite, imparipinnate, 3-foliolate or rarely 1-foliolate, exstipulate or rarely stipulate. *Flowers* regular, hermaphrodite or polygamous, usually small, in racemes or panicles. *Calyx* 3-6-lobed, imbricate or valvate. *Petals* 3-6, free or rarely connate, imbricate or valvate. *Disk* annular or cupular, free or adnate to the calyx-tube. *Stamens* as many as or twice as many as the petals, inserted below or on the disk; filaments free, rarely connate; anthers 2-celled, dehiscing longitudinally. *Ovary* free, 2-5-rarely 1-celled; style simple; stigma undivided or 2-5-lobed; ovules 2, rarely 1 in each cell, axile, usually pendulous. *Fruit* drupaceous, indehiscent with 2-5 pyrenes or dehiscent and pseudocapsular. *Seeds* solitary, pendulous; testa membranous; albumen 0; embryo with membranous usually contortuplicate cotyledons; radicle superior.

Drupe dehiscent valvately, trigonous, the pyrenes separating; seeds compressed, winged 1. *Boswellia*.

Drupe indehiscent, globose or ovoid.

Disk cupshaped:—

Disk adnate to the calyx; pyrenes 1-5, bony, pitted, 1-seeded

2. *Garuga*.

Disk free; pyrenes combined, one only seed-bearing

3. *Commiphora*.

Disk annular, usually lobed :—

Petals valvate ; pyrenes 1-3, free, covered with arilliform pulp

4. *Protium*.

Petals usually imbricate ; pyrenes 1-3, combined, without pulp

5. *Canarium*.

1. *Boswellia*, Roxb.

Trees with papery bark. *Leaves* deciduous, alternate, imparipinnate, crowded at the ends of the branches ; leaflets opposite, usually more or less crenate or serrate ; stipules 0. *Flowers* hermaphrodite, small, white or pink, in axillary racemes or panicles. *Calyx* small, 5-lobed, persistent. *Petals* 5, distinct, imbricate. *Disk* annular, fleshy, crenate. *Stamens* 10, alternately long and short, inserted on or outside under the disk ; filaments subulate ; anthers oblong or ovate. *Ovary* sessile, 3-celled ; style short ; stigma 3-lobed ; ovules 2 in each cell, collateral, pendulous. *Fruit* a trigonous drupe containing 3 pyrenes, valves septicidal ; pyrenes 1-seeded, bony, cordate with a long apex, surrounded by a broad membranous wing. *Seeds* compressed, pendulous ; testa membranous ; cotyledons multifid, contortuplicate.

Leaflets deeply broadly crenate, oblong-lanceolate, pubescent ; racemes usually paniced ; drupes ovoid 1. *serrata*.

Leaflets entire or shallow-crenate, lanceolate, obtuse, glabrous or only puberulous on the nerves ; racemes usually simple ; drupes oblong-obovoid

2. *glabra*.

1. *BOSWELLIA SERRATA*, Roxb. ; F. B. I. i. 528, *excl. var. glabra*.
B. thurifera, Colebr. ; W. & A. 174.

Deccan, in Hyderabad, perhaps also Bellary, common in N. and C. India.

A large tree of dry rocky places, with ash-coloured bark of papyraceous texture, conspicuous especially in the hot season. Vern. *Hind.* Salai.

2. *BOSWELLIA GLABRA*, Roxb. ; Roxb. Cor. Pl. iii. t. 207 ; W. & A. 174 ; Bedd. Fl. t. 174. *B. serrata*, Roxb. var. *glabra*, F. B. I. i. 528.

Deccan and Carnatic from the Gadavari to Mysore, in dry forests on poor rocky soil.

A large and conspicuous tree, with yellowish bark which exfoliates in thin flakes, and moderately hard white or brownish wood. It gives a fragrant gum-resin. Vern. *Tam.* Kungli, Gugulu ; *Tel.* Andaga ; *Kan.* Chitta.

2. *Garuga*, Roxb.

Large trees. *Leaves* alternate, imparipinnate, crowded at the ends of the branches; leaflets opposite, subsessile, crenate; stipules 0. *Flowers* polygamous, in much-branched panicles. *Calyx* campanulate, 5-lobed, valvate. *Petals* 5, inserted on the tube of the calyx, outside the disk. *Disk* thin, crenate at the margin, lining the tube of the calyx. *Stamens* 10, equal or alternately long and short, inserted with the petals; filaments subulate; anthers oblong. *Ovary* ovoid, 4-5-celled; style erect; stigma capitate, 4-5 lobed; ovules 2 in each cell, collateral. *Fruit* a globose fleshy drupe, with 1-2 bony pitted pyrenes, each 1-seeded. *Seed* with membranous or crustaceous testa; cotyledons thin, twice divided into narrow linear lobes, contortuplicate.

Panicles crowded, short-peduncled, under 6 in. long; calyx-tube long, deciduous; ovary villous; drupe large, .5 in. or more in diam.; leaflets usually tomentose, at any rate when young, crenatures short...1. *pinnata*. Panicles slender, few, long-peduncled, often 9 in. long; calyx-tube short, persistent; ovary glabrous; drupe small, .25 in. in diam.; leaflets glabrous, crenatures broad.....2. *Gamblei*.

1. *GABUGA PINNATA*, Roxb.; Cor. Pl. iii. t. 208; F. B. I. i. 528; W. & A. 175; Wt. Ic. tt. 1594, 1595; Redd. Fl. t. 118; Brand. For. Fl. t. 13.

N. Circars, in the forests of Ganjam and Vizagapatam; Deccan from Hyderabad to Mysore, in deciduous forests; W. Gháts in S. Canara, Malabar and Coimbatore.

A large tree with thick bark and reddish-brown moderately hard wood of fair quality. The fruit is edible. Vern. *Hind.* Kharput; *Ur.* Sompotri; *Tel.* Garuga; *Tam.* Karre vemba.

2. *GABUGA GAMBLEI*, King; W. W. Smith in Rec. Bot. Surv. Ind. iv. 262.

W. Gháts in Malabar and Nilgiris, up to about 5,000 ft. (Wight, Gardner), Coonoor and Sigúr Gháts (Lawson).

A large tree, easily recognized by its long inflorescence and small fruits.

3. *Commiphora*, Jacq.

Trees or shrubs; branches often spinescent. *Leaves* alternate, 8-foliate or imparipinnate; leaflets sessile or shortly petioluled,

entire crenate or serrate, lateral ones often small; stipules $\nearrow$. Flowers polygamous, small, fascicled or in paniculate dichasia. Calyx cupular urceolate or tubular, 4- rarely 5-6-lobed, valvate, persistent. Petals 4, rarely 5-6, inserted on or under the margin of the disk. Disk cupshaped. Stamens 8-10, inserted on or under the margin of the disk, alternately long and short; filaments subulate or filiform, sometimes dilated at base; anthers ovate or oblong, dehiscing longitudinally. Ovary ovoid, sessile, 2-4-celled; style short; stigma 3-4-lobed; ovules 2 in each cell, collateral. Fruit an ovoid or subglobose fleshy drupe, 2-6-valved; pyrenes crustaceous or bony, one only seed-bearing. Seed with membranous testa; cotyledons contortuplicate, very thin.

Armed; flowers few, in fascicles or solitary, leaves small, 3-foliolate, the side leaflets smaller than the end one:—

Calyx-lobes as long as the tube, glandular; leaflets 1-3, dentate above, obovate; branches ending in a sharp spine.....1. *Mukul*.

Calyx-lobes shorter than the tube, glabrous; leaflets 3, entire or broadly crenate, obtuse; many branchlets, all ending in sharp spines

2. *Berryi*.

Unarmed; flowers many, in long-peduncled paniculate dichasia up to 5 in. long; leaves imparipinnate with 2-5 pairs of leaflets, the side ones not much smaller than the end one:—

Leaflets glabrous, ovate or orbicular, acute or long-acuminate, usually abruptly, the end one long-petioled; calyx-tube glabrous without

3. *caudata*.

Leaflets pubescent, ovate or obovate, shortly acuminate, the end one subsessile; calyx-tube pubescent without 4. *pubescens*.

1. *COMMIPHORA MUKUL*, Engl. *Balsamodendron Mukul*, Hook.; F. B. I. i. 529.

Bellary and Mysore (Wight).

A small tree or shrub, with greenish-yellow bark and soft white wood. The gum is used in medicine.

2. *COMMIPHORA BERRYI*, Engl. *Balsamodendron Berryi*, Arn.; F. B. I. i. 529; Bedd. Fl. t. 126. *Protium gileadense*, W. & A. 177.

Dry forests of the N. Coimbatore Hills, planted to make hedges from thence southwards in the Carnatic; Tinnevely District (Barber).

A good-sized tree (Beddome) with many sharp spines. It gives a gum-resin.

3. *COMMIPHORA CAUDATA*, Engl. *Protium caudatum*, W. & A. 176; F. B. I. t. 580; Bedd. Fl. t. 125.

Dry forests of the Deccan and Carnatic in Bellary, Cuddapah, Mysore, S. Arcot, rare in Travancore and Coimbatore. A deciduous tree with papery bark and greyish soft wood. Vern. Tel. Konda mamidi; Kan. Konda mavu; Tam. Kiluvai.

4. *COMMIPHORA PUBESCENS*, Engl. *Protium pubescens*, W. & A. 176; F. B. I. t. 580.

W. Gháts, in the Anamalai Hills (Beddome).
A middling-sized tree.

4. *Protium*, Burm.

Trees. *Leaves* alternate, imparipinnate, rarely 1-foliate; leaflets opposite, petiolulate; stipules 0. *Flowers* small, hermaphrodite or polygamous, in short branched panicles. *Calyx* small, 4-6-lobed, imbricate. *Petals* 4-6, inserted under and outside the disk, valvate. *Disk* annular, crenately lobed, fleshy. *Stamens* 8-12, nearly equal, inserted at the base of the disk within the petals, filaments subulate, anthers ovate. *Ovary* ovoid or subglobose, 4-5-celled; style short; stigma 4-5-lobed; ovules 2 in each cell, collateral. *Fruit* a globose or ovoid drupe with usually 1-3 pyrenes covered with a fibrous arilliform pulp; pyrenes very hard, bony. *Seed* conform to the pyrene; testa membranous; cotyledons contortuplicate.

- PROTIUM SERRATUM*, Engl. *Bursera serrata*, Colebr.; F. B. I. t. 580. *Icica indica*, W. & A. 177.

N. Circars, Hills of the E. Gháts from Ganjam to the Godavari, in ravines and along streams; Deccan, in Hyderabad.

A large evergreen tree with serrate leaves, very small flowers, a subacid 1-3-lobed fruit and a reddish close-grained wood. Vern. Ur. Sorupotri moi; Tel. Chitreka.

5. *Canarium*, Linn.

Tall trees. *Leaves* large, alternate, imparipinnate; leaflets usually petiolulate, opposite, often unequal, stipulate or exstipulate. *Flowers* hermaphrodite or polygamous, in terminal or axillary often elongate panicles. *Calyx* cupular or urceolate, 8-lobed, valvate, persistent. *Petals* 8, imbricate or valvate, ovate or oblong, inserted outside the disk. *Disk* annular, entire or

lobed. *Stamens* 6, rarely only 3, inserted outside the disk; filaments free or connate at the base; anthers oblong-triangular, dorsifixed, introrse. *Ovary*, ovoid, in ♂ flowers reduced to a pistillode, 2-3-celled; style stout; stigma capitate, 2-3-lobed. *Fruit* an ovoid or ellipsoid, often trigonous drupe with a 1-3-celled, 1-3-seeded stone. *Seed* conform to the cell; testa membranous; cotyledons contortuplicate, often divided.

CANARIUM STRICTUM, Roxb.; F. B. I. i. 534; W. & A. 175; Bedd. Fl. t. 128.

W. Gháts, common in moist evergreen forests, up to about 5,000 ft.

A very large, handsome tree with straight white cylindrical stem. The large pinnate leaves when very young are bright yellow turning velvety crimson, when older they are rusty tomentose and at length subglabrous. The flowers are polygamous and the stamens have the filaments combined in a tube. The wood is soft and of little value. The tree gives a black resin. Vern. *Tam.* Karapu kangilam, Karang kunthrikam; *Mal.* Kunthirikka payin, Thalli; *Kan.* Manda dhup.

Canarium commune, Linn., is a large tree occasionally found in cultivation.

Family XXXVIII. MELIACEAE.

Trees or shrubs. *Leaves* alternate; usually pinnate, rarely simple or bipinnate; leaflets opposite or alternate, generally oblique at the base; stipules 0. *Flowers* regular, hermaphrodite or polygamo-dioecious, in terminal or axillary panicles. *Calyx* usually small, 3-6-lobed, rarely entire or with free sepals, usually imbricate. *Petals* 3-6, free or rarely connate at the base, sometimes adnate below to the staminal-tube, valvate imbricate or contorted. *Disk* tubular or annular, free or adnate to the ovary or obsolete. *Stamens* 4-12; filaments connate in a tube or rarely free; anthers erect, usually sessile on the tube, included or exserted, 2-celled, longitudinally dehiscent. *Ovary* usually free, 2-5-celled; style simple; stigma disciform or capitate; ovules 2, rarely more, collateral or superposed, rarely solitary. *Fruit* dehiscent or indehiscent, capsular baccate or drupaceous. *Seeds* sometimes arillate, sometimes winged; exalbuminous or with fleshy albumen, embryo usually flat, cotyledons fleshy.

Stamens united in a tube :—

Seeds without wings :—

Cells of ovary with 1-2 ovules :—

Leaflets usually toothed :—

Seeds albuminous ; cotyledons thin, foliaceous :—

Flowers elongate :—

Fruit a capsule, chiefly shrubs :—

Leaves simple, entire or obtusely lobed ; ovules 2, superposed 1. **Turraea**.

Leaves 3-foliolate, leaflets entire or obtusely lobed ; petioles winged ; ovules 2, collateral ...2. **Naregamia**.

Leaves pinnate, leaflets entire or coarsely lobed ; ovules 2, superposed.....3. **Munronia**.

Fruit a fleshy drupe, chiefly trees ; leaves usually bipinnate ; ovules 2, superposed.....4. **Melia**.

Flowers globose ; fruit a 5-celled drupe ; leaves pinnate, leaflets entire or serrate ; ovules 2, collateral ...5. **Cipadessa**.

Seeds exalbuminous ; leaves pinnate, leaflets serrate ; fruit a 1-seeded drupe ; ovules 2, collateral 6. **Azadirachta**.

Leaflets entire ; seeds exalbuminous ; cotyledons fleshy :—

Flowers and staminal-tube oblong ; ovules 2 ; disk tubular or cupshaped 7. **Dysoxylum**.

Flowers and staminal-tube globose or turbinate ; ovules 1-2 in each cell :—

Anthers included in the staminal-tube or only the tips exerted :—

Anthers 5, isomerous ; seeds exarillate ; disk 0 or obscure 8. **Aglaia**.

Anthers 6-10, usually 6, in one row ; seeds arillate ; fruit a loculicidal capsule.....9. **Amoora**.

Anthers 10, in 2 rows ; seeds arillate ; fruit a berry

10. **Lansium**.

Anthers exerted or filaments more or less free :—

Seeds arillate :—

Berry indehiscent ; filaments more or less connate, sometimes free 11. **Walsura**.

Capsule loculicidal ; filaments connate below, free at apex 12. **Heynea**.

Seeds exarillate ; staminal-tube globose, the anthers attached by the backs of their connectives

13. **Beddomea**.

Cells of ovary with 2-12 ovules ; fruit a large capsule, seeds angular ; arillus 0.....14. **Xylocarpus**.

Seeds with wings; leaves pinnate or sometimes bipinnate; cells of ovary with numerous ovules:—

Staminal-tube cupshaped; disk conspicuous; seeds albuminous, winged at both ends 15. *Soyyida*.

Staminal-tube urceolate; disk annular; seeds albuminous, winged at the upper end.....*Swietenia*.

Staminal-tube cylindric; disk 0; seeds winged below only, exalbuminous.....16. *Chukrasia*.

Stamens distinct on a fleshy torus, sometimes with alternating staminodes; cells of ovary with 8-12 ovules; seeds albuminous, winged at both ends or only below 17. *Cedrela*.

1. *Turraea*, Linn.

Trees or shrubs. *Leaves* simple, alternate, entire or obtusely lobed. *Flowers* hermaphrodite, in axillary clusters or short racemes, bracteate. *Calyx* campanulate, 4-5-lobed. *Petals* 4-5, free, elongate, linear-spathulate. *Disk* annular or obsolete. *Staminal-tube* cylindric, elongate, toothed at the apex; anthers 8-10, short, inserted just within the mouth of the tube, alternating with the teeth. *Ovary* 5- or more-celled; style elongate, exsert; stigma urceolate or capitate; ovules 2 in each cell, superposed. *Fruit* a 4- or more-celled capsule; cells 1-2-seeded; valves woody or coriaceous, separating from the winged axis. *Seeds* oblong, with a broad ventral hilum; albumen fleshy; cotyledons foliaceous; radicle superior.

TURRAEA VILLOSA, Benn.; F. B. I. i. 542; Wt. Ic. t. 1593.

W. Ghâts in the Anamalai Hills up to 4,000 ft. (Beddome, Fischer); hills of Travancore (Wight), not common.

A large shrub with membranous ovate acuminate entire leaves up to 4 in. long and large white fragrant flowers up to 2 in. long.

2. *Naregamia*, W. & A.

A small branching undershrub. *Leaves* alternate, 3-foliolate, petiole winged. *Flowers* solitary or 2 together, axillary. *Calyx* 5-lobed, imbricate. *Petals* 5, free, elongate, linear-spathulate. *Disk* annular. *Staminal tube* long, slender, cylindric below, inflated near the top and sometimes cleft in two parts, obscurely 10-crenate at the mouth; anthers 10, appendaged at the apex. *Ovary* 3-celled; style filiform; stigma capitate; ovules 2 in each cell, collateral, pendulous. *Fruit* an ovoid-globose capsule,

loculicidally 3-valved, the valves separating from the 3-winged axis, the cells 2-seeded. *Seeds* pendulous, curved, truncate at both ends, muricate, with a short double membrane along the side next the axis; albumen fleshy; cotyledons flat, foliaceous.

NAREGAMIA ALATA, W. & A. 117; F. B. I. i. 542; Wt. Ic. t. 90.

W. Gháts, in all Districts, up to 3,000 ft., in forest undergrowth.

An undershrub with pretty white flowers 1-1½ in. long, the leaflets small, cuneate-obovate. • Vern. *Mal.* Nelanáregam.

3. Munronia, Wt.

Shrubs or undershrubs. *Leaves* alternate, imparipinnate; leaflets opposite, entire or coarsely toothed. *Flowers* hermaphrodite, elongate, in few-flowered bracteate axillary cymes. *Calyx* usually with elongate tube, 5-lobed, lobes subfoliaceous. *Petals* 5, elongate-spathulate, free or partly cohering, spreading. *Disk* tubular, membranous, sheathing the ovary and base of the style. *Staminal-tube* cylindrical, 10-toothed at the apex; anthers 10, terminal, apiculate. *Ovary* 5-celled; style elongate, slender; stigma capitate; ovules 2 in each cell, superposed. *Fruit* a depressed-globose, 5-lobed, loculicidal capsule; valves separating from the 5-winged axis. *Seeds* plano-convex, the hilum ventral, hollowed, the margins fringed with incurved laciniae; albumen thin; cotyledons flat, foliaceous; radicle short.

MUNRONIA WALLICHII, Wt. Ill. i. 147; F. B. I. i. 543. *M. neelgherrica*, Wt. Ill. i. 147, t. 54.

W. Gháts from S. Canara to the Anamalais and Pulneys, up to 4,000 ft.

A low shrub in thick forest undergrowth. Flowers conspicuous, pink; leaflets 5-9, lanceolate or ovate, pubescent; capsule pubescent, about 5 in. in diam.

✓ 4. Melia, Linn.

Trees or shrubs. *Leaves* alternate, 2-3-pinnate; leaflets toothed, serrate or entire. *Flowers* hermaphrodite, in large many-flowered axillary panicles. *Calyx* 5-lobed, imbricate. *Petals* 5, free, much longer than the calyx-lobes. *Disk* annular. *Staminal-tube* a little shorter than the petals, cylindric, slightly dilated and laciniate at the mouth; anthers 10, within the tube at its apex, apiculate. *Ovary* 5-8-celled; style cylindric, elongate;

stigma capitate, sometimes lobed; ovules 2 in each cell, superposed. *Fruit* a fleshy drupe with hard woody endocarp; ~~cells~~ 1-seeded. *Seeds* pendulous, elliptic; testa crustaceous; albumen fleshy or scanty; cotyledons foliaceous; radicle terete, superior.

Flowers lilac; anthers nearly equalling the laciniae of the purple staminal tube; drupe ellipsoid-globose, 5-7 in. in diam....1. *Azedarach*.
Flowers white; anthers exceeding the laciniae of the white staminal tube; drupe ovoid or ellipsoid, 1-1.5 in. long 2. *composita*.

1. *MELIA AZEDARACH*, Linn.; F. B. I. i. 544; W. & A. 117; Wt. Ic. t. 160; Bedd. Fl. t. 13.

Cultivated in most Districts and occasionally found run wild. The Persian Lilac.

A pretty but not very big tree with a soft red-cedar-like wood, useful for furniture, but little used as it is not a forest tree properly speaking. Vern. *Hind.* Bakain; *Tel.* Taraka vepa; *Tam.* Mallay vembu; *Kan.* Bévu.

2. *MELIA COMPOSITA*, Willd.; W. & A. 117; Bedd. Fl. t. 12.

M. dubia, Hiern in F. B. I. i. 545 (not of Cav.).

N. Circars, Hills of Ganjam; Deccan in the Nallamalai Hills of Kurnool at 2,000 ft.; W. Gháts from S. Canara to Tinnevely at low elevations.

A large deciduous tree with a soft reddish-white wood. Vern. *Tam.* Mallay vembu; *Kan.* Heb bévu.

5. *Cipadessa*, Blume.

Small trees or shrubs. *Leaves* alternate or subopposite, imparipinnate; leaflets opposite or nearly so, entire or coarsely serrate; stipules 0. *Flowers* small, hermaphrodite, in axillary peduncled panicles. *Calyx* 5-lobed. *Petals* 5, oblong, free, spreading, valvate. *Disk* cupular, adnate to the base of the staminal tube. *Stamens* 5-10; filaments united below in a short tube, free above, 2-toothed at the apex; anthers inserted between the teeth, short, apiculate. *Ovary* 5-celled; style short; stigma clavate-capitate; ovules 2 in each cell, collateral. *Fruit* a 5-ribbed, 5-celled, hardly fleshy drupe; cells 1-2-seeded. *Seeds* angled; albumen fleshy; embryo curved, the cotyledons oblong; radicle superior.

CIPADESSA BACCIFERA, Miq. *C. fruticosa*, Bl.; F. B. I. i. 545.

Mallea Rothii, W. & A. 118.

N. Circars, common on laterite hills, near villages and in dry

forests; Deccan., chiefly in hilly country, up to 4,000 ft.; W. Gháts, in forest undergrowth up to 5,000 ft.

A bushy shrub or small tree with pinnate leaves and small flowers. The wood is red and used for fuel. Vern. *Hind.* Nal bila; *Ur.* Ranabili; *Tel.* Chend-bera, Purudona; *Tam.* Pulippan cheddi.

6. *Azadirachta*, A. Juss.

Tree. *Leaves* alternate, imparipinnate; leaflets subopposite, serrate, very unequal at base. *Flowers* hermaphrodite, in axillary panicles. *Calyx* 5-lobed. *Petals* 5, much exceeding the calyx, free, imbricate. *Disk* 0. *Staminal tube* a little shorter than the petals, cylindric, widening above, 9-10-lobed at the apex, the lobes truncate, again slightly toothed; anthers within the tube opposite to and shorter than the lobes. *Ovary* 3-celled; style elongate, slender; stigma shortly cylindric, 3-lobed; ovules 2 in each cell, collateral. *Fruit* a 1-seeded drupe, endocarp woody. *Seed* ellipsoid; albumen 0; cotyledons thick, fleshy, cordate at base; radicle superior.

AZADIRACHTA INDICA, A. Juss.; W. & A. 118; Wt. Ic. t. 17. *Melia Azadirachta*, Linn.; F. B. I. i. 544; Bedd. Fl. t. 14.

Dry forests of the Deccan and Carnatic; elsewhere largely planted and often found run wild; will thrive on black cotton soil. The Neem or Margosa tree.

A very important and useful deciduous tree with a hard close-grained wood resembling Mahogany. The bark, leaves, flowers, seeds and the oil they give, are all in use for food, medicinal and other purposes. Vern. *Hind.* Nim.; *Tel.* Yapa, yepa; *Tam.* Vepa.

7. *Dysoxylum*, Blume.

Trees. *Leaves* large, alternate or rarely opposite, imparipinnate or abruptly pinnate; leaflets entire, opposite or alternate, oblique; stipules 0. *Flowers* hermaphrodite, paniculate. *Calyx* subentire or 4-5-lobed. *Petals* 4-5, oblong, spreading, valvate or slightly imbricate. *Staminal tube* cylindrical, dentate or crenulate at the mouth; anthers 8-10, included or half exserted, inserted below the apex of the staminal tube. *Disk* tubular or cupshaped, as long as or longer than the ovary which it surrounds. *Ovary* free, 2-5-celled; attenuated into a long style; stigma broadly

capitate; ovules 1-2 in each cell, superposed or collateral. *Fruit* a globose or pyriform 1-4-celled loculicidal capsule; valves coriaceous. *Seeds* without, rarely with, an arillus; testa coriaceous; albumen 0; cotyledons thick, fleshy; plumule often hirsute, enclosed between the cotyledons.

Calyx cupshaped, subentire, nearly half the length of the petals; leaflets reticulately nerved; disk tubular, acutely lobed; ovary 3-5-celled; capsule reddish 1. *binectariferum*.

Calyx very shortly 4-lobed; leaflets not prominently nerved and reticulate; disk tubular, slightly toothed:—

Ovary 2-celled; capsule yellow, rough 2. *Beddomei*.

Ovary 4-celled; capsule purple, smooth 3. *ficiforme*.

Calyx deeply 4-lobed; leaflets with impressed nerves not prominently reticulate but with regular main nerves; disk cupshaped; entire, only just enclosing the 4-celled ovary; capsule yellow, longitudinally furrowed..... 4. *malabaricum*.

1. *DYSOXYLUM BINECTARIFERUM*, Hook. f.; F. B. I. i. 546.

D. macrocarpum, Bedd. Fl. t. 150.

W. Gháts from Coorg to the Anamalais and Tinnevely, in moist forests, but apparently absent from Travancore.

A tree with leaves up to 18 in. long and flowers in racemiform panicles. Vern. *Kan. Agil*.

2. *DYSOXYLUM BEDDOMEI*, Hiern; F. B. I. i. 548.

Evergreen forests of Peermerd and the Cardamom Hills in Travancore, up to 3,400 ft.

A large tree with leaves 12-15 in. long and yellow ribbed capsule. Vern. *Tam. Adanthei*.

3. *DYSOXYLUM FICIFORME*, Gamble. *D. purpureum*, Bourd. in

Journ. Bomb. Nat. Hist. Soc. xii. 349, t. 2. *Amoora ficiformis*, Wt. Ill. 147; F. B. I. i. 546 in note under *D. binectariferum*.

Evergreen forests of the Koni and Rani valleys in Travancore, at 1,000 to 2,000 ft.

A large tree with leaves 12-15 in. long and purple smooth capsule. Wood reddish-brown, close-grained. Vern. *Mal. Kar agil, Puvil agil*.

4. *DYSOXYLUM MALABARICUM*, Bedd.; F. B. I. i. 548.

W. Gháts from Mysore to the Anamalais and Travancore, up to 8,000 ft. White Cedar.

A very large tree, reaching 120 ft. in height and 5 ft. in

girth, with pale green leaves and flowers in axillary panicles. Bark grey with white warts. Wood yellowish or light orange, hard and elastic, used in Cochin for oil-casks. Vern. *Mal.* Vella agil.

8. *Aglaiia*, Lour.

Trees or shrubs, glabrous stellately-pubescent or -lepidote. *Leaves* alternate, pinnate; leaflets entire, opposite or subopposite; stipules 0. *Flowers* polygamo-dioecious, minute or small, globose, in axillary branching panicles. *Calyx* 5-lobed, imbricate. *Petals* 5, free, concave, imbricate. *Staminal tube* urceolate or subglobose, entire or more or less 5-toothed at the apex; anthers usually 5, erect, included or partly exerted. *Disk* 0 or inconspicuous. *Ovary* ovoid, 1-2- rarely 3-celled; style very short; stigma simple or lobed; ovules 1-2 in each cell. *Fruit* a 1-2-celled and -seeded berry with a coriaceous pericarp. *Seeds* with a fleshy aril-like testa; albumen 0; cotyledons thick, superposed, enclosing the minute villous embryo (corculus).

Stamens quite included in the tube; leaflets with main nerves nearly at right angles with the midrib:—

Leaflets 3-7, flowers in close panicles under 6 in. long:—

Leaflets usually more or less elliptic, sometimes lanceolate or oblanceolate; berry ovoid, not depressed; branches of ♀ panicle spicate, flowers sessile, of ♂ cymose, flowers shortly pedicelled; staminal tube usually somewhat contracted at base, stamens small, on the middle of the tube.....1. *Roxburghiana*.

Leaflets usually lanceolate, sometimes elliptic; berry depressed-globose; branches of panicle cymose, flowers pedicelled; staminal tube not contracted at base, stamens nearly as long as tube

2. *Barberi*.

Leaflets about 13; flowers in lax panicles up to about 15 in. long:—

Leaflets lanceolate, black when dry, unequally acute at base; flowers glabrous, pedicelled, black when dry; calyx-lobes acute ...3. *Maiae*.

Leaflets lanceolate, olive-brown when dry, obtusely acute or even rounded at base; flowers lepidote, sessile, brown when dry; calyx-lobes obtuse, ciliate 4. *canarensis*.

Stamens exert from the tube:—

Leaflets 3-7, oblanceolate, densely scaly beneath with very prominent oblique main nerves; flowers in close panicles under 6 in. long, pedicels short 5. *Bourdillonii*.

Leaflets up to about 15, conspicuously but not very obliquely nerved, densely stellately tomentose; flowers in spreading panicles up to 18 in. long; pedicels long, slender 6. *minutiflora*.

1. *AGLAIA ROXBURGHIANA*, Hiern; F. B. I. i. 555, in part. *Milnea Roxburghiana*, W. & A. 119; Wt. Ic. t. 166.

• South Deccan; W. Gháts, in S. Canara and Malabar.

A tree with 5–7 leaflets, which are oblong, nearly sessile, and up to 6 in. long and 2 in. broad.

Apparently a rather scarce tree, well figured in Ic. t. 166.

But there are also two well-marked varieties:—

- var. 1. *Beddomei*, *A. Roxburghiana*, Bedd. Fl. t. 130A.

Leaflets usually 7, narrow lanceolate, rarely oblanceolate, pale beneath and drying grey, up to 4 in. long and 1 in. broad; flowers pedicelled (in ♂ at any rate); berry globose, 1.5 cm. in diam.

E. Gháts, from Ganjam to Godavari; Hills of the Deccan; Travancore up to 3,000 ft.

A tree with bright red hard wood and light brown bark.

Vern. Tel. Yerra aduga; Tam. Chokkala; Mal. Punyáva.

Var. 2. *courtallensis*, leaflets usually 5, small, oblanceolate, very grey when dry, 1–2.5 in. long and .5–1 in. broad; berry small.

W. Gháts, in the Hills of Tinnevely.

2. *AGLAIA BARBERI*, Gamble in Kew Bull. 1915, 346.

W. Gháts, in the Anamalai Hills and those of Travancore and Tinnevely, at about 3,000 ft.

3. *AGLAIA MAIAE*, Bourdillon in Journ. Bomb. Nat. Hist. Soc. xii. 349.

W. Gháts, in the Hills of Travancore, up to 1,200 ft. (Bourdillon).

A handsome evergreen tree with dark reddish-brown bark and sweet-scented wood. The leaves and flower panicles are black when dry.

4. *AGLAIA CANARENSIS*, Gamble in Kew Bull. 1915, 347.

W. Gháts of S. Canara.

5. *AGLAIA BOURDILLONII*, Gamble in Kew Bull. 1915, 346. *A. Roxburghiana*, Bedd. Fl. t. 130B, not of W. & A.

W. Gháts, in the Hills of Travancore, above 3,500 ft. (Beddome, Bourdillon).

6. *AGLAIA MINUTIFLORA*, Bedd. Ic. t. 193. *A. minutiflora*, var. *travancorica*, Hiern in F. B. I. i. 557.

W. Gháts, in the Anamalai and Travancore Hills, from 1,500 to 3,000 ft., in the evergreen forests.

A slender tree with long leaves, large, very tomentose, long-acuminate leaflets and minute flowers in large panicles. The wood is reddish-pink and fragrant. Vern. *Mal.* Nir mulei.

Aglaia odorata, Lour., is a small pretty tree sometimes found in Madras gardens.

9. *Amoora*, Roxb.

Trees, the young parts sometimes lepidote. *Leaves* imparipinnate; leaflets oblique, entire. *Flowers* polygamo-dioecious, small, ♂ paniculate, ♀ or ♂ in spikes or racemes. *Calyx* 3-5-lobed. *Petals* 3-5, thick, concave, imbricate. *Disk* 0. *Staminal-tube* subglobose or campanulate, slightly crenate at the mouth; anthers 6-10, included. *Ovary* short, 3-celled; style 0 or short; stigma pyramidal or disciform, usually vertically lobed; ovules 1-2 in each cell, in ♂ flowers abortive or absent. *Fruit* a subglobose coriaceous loculicidally 3-5-valved capsule. *Seeds* surrounded by a fleshy aril, the hilum ventral; testa coriaceous; albumen 9; cotyledons superposed or conferruminate, enclosing the minute villous embryo.

Inflorescence as long as or nearly as long as the nearly glabrous leaves:—

Petals 3; *stamens* 6-7; leaves large, up to 2 ft. long; leaflets thick, 9-17, up to 9 in. long, 4 in. broad; ♂ flowers in panicles of spikes or racemes, ♀ flowers in long spikes 1. *Rohituka*.

Petals 4; *stamens* 8-10; leaves moderate-sized, up to 1 ft. long; leaflets rather thin, 5, up to 7 in. long, 2-5 in. broad; ♂ flowers in panicles of racemes, ♀ flowers in short spikes 2. *Lawii*.

Inflorescence much shorter than the lepidote leaves, up to 5 in. long; leaves large, up to 15 in. long; leaflets thin, up to 7 in. long, 3 in. broad; flowers very small, petals 4, stamens 6-7 3. *canarana*.

1. *AMOORA ROHITUKA*, W. & A. i. 119; F. B. I. i. 559; Bedd. Fl. t. 132.

W. Gháts, in all Districts from S. Canara to Tinnevely, at low elevations and up to 3,500 ft. in moist forests, especially common and usually with pedicellate male flowers in the Anamalais.

A moderate-sized evergreen tree with a red useful hard wood, little used. Vern. *Hind.* Harin-hara; *Mal.* Chemmaram.

2. AMOORA LAWII, Bedd. Fl. t. 138; F. B. I. i. 561.

W. Gháts, in Malabar (Wight), Tinnevelly (Brasier).

A moderate-sized tree, apparently scarce.

3. AMOORA CANARANA, Hiern in F. B. I. i. 560.

W. Gháts, in the Anamalais (Beddome), Travancore Hills in evergreen forests up to 3,500 ft.

A large evergreen tree.

10. Lansium, Rumph.

Trees or shrubs. *Leaves* imparipinnate, leaflets alternate or opposite, shortly petiolulate, entire. *Flowers* polygamo-dioecious, 5-merous, the ♂ usually in panicles, the ♀ in spikes or racemes. *Calyx* of 5 rounded imbricate sepals. *Petals* 5, concave, connivent, imbricate. *Disk* inconspicuous. *Staminal tube* globose, crenulate; anthers 10, usually in two rows, the lower included, the upper partly exerted, sometimes apiculate, the attached filaments prominent. *Ovary* globose, 3-5-celled; style very short, thick; stigma 3-5-lobed, truncate; ovules 1-2 in each cell, attached to the axis. *Fruit* a 1-5-celled corky or fleshy berry. *Seeds* solitary or 2, collateral, oblong, imbedded in a pulpy aril; albumen 0; cotyledons transverse; radicle superior.

LANSIUM ANAMALLAYANUM, Bedd.; F. B. I. i. 558; Bedd. Ic. t. 105, Fl. t. 131.

W. Gháts, in the Anamalais and the Hills of Malabar, Travancore and Tinnevelly at 1,500 to 3,000 ft.

A handsome medium-sized tree of the evergreen forests, said to have a pink, sweet-scented wood and edible fruit. Vern. *Tam.* Santhana viri; *Mal.* Vahdakamin.

Lansium domesticum, Jack, the "Doekoe" tree of Java, is sometimes cultivated for its excellent fruit.

11. Walsura, Roxb.

Trees. *Leaves* imparipinnate; leaflets 1-5, usually opposite, entire; stipules 0. *Flowers* small, hermaphrodite, in axillary and terminal panicles. *Calyx* small, 5-lobed, the lobes imbricate. *Petals* 5, oblong, slightly imbricate or subvalvate. *Stamens* 8 or 10, linear or subulate, free or partly connate in a tube, the apex

usually notched; anthers terminal or inserted in the notches of the filaments. Disk usually annular, fleshy. Ovary short, 2-3-celled, sunk in the disk; style short, obconic; stigma turbinate-capitate, 2-3-toothed at apex; ovules in each cell 2, collateral. Fruit an indehiscent tomentose berry, 1- rarely 2-celled, 1-2-seeded. Seed enclosed in a fleshy arillus; albumen 0; cotyledons thick, fleshy, plano-convex; radicle superior.

WALSURA PISCIDIA, Roxb.; F. B. I. i. 564; W. & A. 120.

W. ternata, Roxb.; F. B. I. i. 563; W. & A. 120.

N. Circars and Carnatic, in dry evergreen forests, especially near the coast, as at Vizagapatam, Striharikota in Pellore, Pulicat, and in S. Arcot; Hills of the Deccan, in Cuddapah and Chingleput; W. Gháts, in the Anamalais, Pulneys and Travancore.

A moderate-sized tree with trifoliolate leaves, corymbosely paniced flowers, ovoid fruit, 5 in. long, with a white aril and hard dark red black-streaked wood. Vern. Tel. Walursi; Tam. Walsura; Mal. Pér illa piccha.

12. Heynea, Roxb.

Trees or rarely shrubs. Leaves imparipinnate; leaflets 5-11, opposite, petiolulate, entire. Flowers small, hermaphrodite, in long-peduncled terminal and axillary panicles. Calyx short, 4-5-lobed, lobes imbricate. Petals 4-5, free, oblong, suberect, subimbricate. Stamens 8-10; filaments connate more or less in a tube, linear, 2-toothed at apex; anthers ovate, attached between the teeth, mucronate. Disk annular, fleshy. Ovary sunk in the disk, 2-3-celled; style slightly obconic; stigma 2-3-toothed with a thickened base; ovules 2 in each cell, collateral, pendulous. Fruit a 1-celled, 2-valved capsule. Seed surrounded by a fleshy white aril; testa membranous; albumen 0; cotyledons hemispheric, plano-convex; radicle superior.

HEYNEA TRIJUGA, Roxb.; F. B. I. i. 565. *H. affinis*, Juss.; W. & A. 121; Bedd. Fl. t. 134.

E. Gháts, in the forests of Godavari and Vizagapatam, to 4,500 ft.; W. Gháts, common from Mysore through Nilgiris and Anamalais to Travancore, up to 6,000 ft.

A small pretty tree with pinnate long-petiolulate leaves, corymbose panicles of small flowers and white arillate seeds. Wood grey, moderately hard. Vern. Kan. Kora; Mal. Korakadi.

13. *Beddomea*, Hook. f.

Trees or shrubs, usually lepidote- or stellate-pubescent. *Leaves* alternate, simple or pinnate; leaflets entire. *Flowers* hermaphrodite, in axillary panicles of racemes. *Calyx* 4-6-lobed, imbricate. *Petals* 5-6, free, concave, much imbricate. *Staminal tube* globose, crenulate at the small mouth; anthers 5-6, included or partly exserted, their connectives thick, attached broadly to the tube at their back. *Disk* inconspicuous or 0. *Ovary* short, villous, 3-celled; style short; stigma 3-lobed; ovules 2 in each cell, collateral. *Fruit* an ovoid or obovoid, beaked, furrowed, stellate-pubescent capsule, finally dehiscing in 2-3 cells. *Seeds* 3-5, exarillate; albumen 0; cotyledons fleshy, superposed, enclosing the radicle.

Leaflets 3-5; calyx small, spreading; staminal tube thick, enclosing the large anthers; capsule obovoid 1. *indica*.
 Leaflet 1; calyx usually large, enclosing the petals; staminal tube thin, the anthers small, inserted near the top and partly exsert; capsule oblong
 2. *simplicifolia*.

1. *BEDDOMEA INDICA*, Hook. f.; F. B. I. i. 566.

W. Gháts on the E. slopes of Nilgiris and Hills of Malabar, up to 3,000 ft.

A shrub of the evergreen forest undergrowth.

2. *BEDDOMEA SIMPLICIFOLIA*, Bedd. Fl. t. 135; F. B. I. i. 566.

W. Gháts from Coofg to Travancore and Tinnevely, at 2,000 to 4,000 ft.

A small tree with rather variable inflorescence, separable into three varieties: (1) large flowers in long stout racemes, (2) small flowers in short panicles, and (3) medium flowers in long slender racemes, but they all agree in foliage.

14. *Xylocarpus*, Koen.

Trees, always littoral. *Leaves* alternate, paripinnate; leaflets 1-3 pairs, sometimes solitary. *Flowers* hermaphrodite, in lax few-flowered axillary panicles. *Calyx* 4-lobed, short. *Petals* 4, free, spreading, contorted. *Staminal tube* urceolate-globose, 8-toothed at apex, the teeth again bilobed; anthers 8, included just under the teeth of the tube and alternate with them. *Disk* cupular, fleshy. *Ovary* 4-celled; style thick, short; stigma discoid; ovules 2-12 in each cell. *Fruit* a large globose 4-celled capsule. *Seeds*

6-12, large, thick, angular, pyramidal, convex on the back, arranged radially from the remains of the axis outwards; testa hard; albumen 0; cotyledons superposed, often conferruminate; radicle dorsal at one corner.

XYLOCARPUS OBOVATUS, A. JUSS. *X. Granatum*, W. & A. 121, not of Koen. *Carapa moluccensis*, Bedd. Fl. t. 136, not of Lam.; F. B. I. i. 567.

Swamp forests of East Coast, in the deltas of the Kistna (A. W. Lushington) and Coleroon (Wooldridge).

A moderate-sized evergreen tree with coriaceous leaves, grey bark, and a valuable hard dark red wood. Vern. Hind Pussur; Tam. Somunthiri.

15. *Soymida*, A. Juss.

Large trees. *Leaves* alternate, paripinnate; leaflets opposite, entire or when young crenate-serrate, obtuse, unequal at base. *Flowers* in large terminal or axillary panicles. *Calyx* saucer-shaped, 5-lobed, the lobes imbricate. *Petals* 5, free, spreading, obovate, unguiculate. *Staminal tube* short, cupshaped, 10- sometimes 8-cleft, the lobes again bifid; anthers short, attached to the cleft of the lobes by their backs. *Disk* flat. *Ovary* 5-celled; style short; stigma thick, discoid, 5-angled; ovules many in each cell, biseriate, pendulous. *Fruit* a woody 5-celled, septifragally 5-valved capsule, the valves 2-lamellate, separating from the thick 5-winged axis. *Seeds* numerous, flattened, winged at both ends; albumen fleshy; cotyledons foliaceous, 2-auricled at base; radicle short, superior.

SOYMIDA FEBRIFUGA, ADR. JUSS.; F. B. I. i. 567; W. & A. 122; Bedd. Fl. t. 8. *Swietenia febrifuga*, Roxb. Cor. Pl. i. t. 17.

N. Circars, from Ganjam to the Godavari, in dry forests and on laterite hills; forests of the Deccan from Kurnool to Mysore, and the Hills of Chingleput.

A large tree with greyish-green leaves, thick bluish-grey or brown bitter bark and very hard dark red strong and handsome valuable wood. Vern. Hind. Rohan; Ur. Sohan; Tel. Sumi; Tam. Shen; Kan. Sombi.

16. *Chukrasia*, ADR. JUSS.

Lofty trees. *Leaves* alternate, abruptly pinnate or bipinnate; leaflets alternate or subopposite, entire, unequal at base, acuminate,

usually pubescent or even velvety. *Flowers* hermaphrodite, rather large, in terminal panicles. *Calyx* short, 4-5-lobed, with obtuse lobes. *Petals* 4-5, oblong, free, erect, contorted. *Staminal tube* cylindric, with 8-10 short crenate lobes at the apex; anthers erect, inserted within the crenatures and entirely exsert above them. *Disk* 0. *Ovary* shortly stipitate, cylindric-ovoid, 3-5-celled; style stout; stigma cylindric-capitate; ovules many in each cell, biseriate. *Fruit* a 3-5-celled, septifragally 3-5-valved capsule, the valves 2-lamellate separating from the 3-winged axis and often cleft at apex. *Seeds* many, flattened, broadly winged below; albumen 0; cotyledons orbicular.

CHUKRASIA TABULARIS, Adr. Juss.; F. B. I. i. 568 (*Chikrassia*); W. & A. 123; Wt. Ill. t. 56; Bedd. Fl. t. 9.

Hills of the Deccan up to 4,500 ft., Horsley Konda in Cuddapah, Sandúr Hills of Bellary, Hills of Mysore and Salem; W. Gháts, from Mysore to Tinnevely in evergreen forests at rather low elevations.

A very large and beautiful tree with a reddish-brown bark and yellowish-brown to reddish-brown wood resembling Mahogany. Vern. *Hind.* Chikrasi; *Tel.* Madagari vembu; *Tam.* Aglay, Malei veppu; *Mar.* Pabba.

17. Cedrela, Linn.

Tall trees. *Leaves* imparipinnate; leaflets numerous, opposite or subopposite, entire or serrate. *Flowers* hermaphrodite, small, white, in terminal or subterminal panicles. *Calyx* short, 5-lobed. *Petals* 5, oblong, suberect, free, imbricate. *Stamens* 4-6, free, inserted on a 4-6-lobed raised disk, sometimes with alternating staminodes; filaments subulate; anthers oblong, versatile. *Ovary* sessile on the disk, 5-celled; style slender; stigma discoid; ovules in each cell 8-12, biseriate, pendulous. *Fruit* a coriaceous septifragally 5-valved capsule; valves 2-lamellate. *Seeds* compressed, winged below or at both ends; albumen fleshy; cotyledons flat subfoliaceous; radicle superior.

CEDRELA TOONA, Roxb. Cor. Pl. iii. t. 238; F. B. I. i. 568; W. & A. 124; Wt. Ic. t. 161; Bedd. Fl. t. 10; Brand. For. Fl. t. 14.

E. Gháts in valleys and moist forest localities, fairly common in Ganjam, less so southwards; Hills of the Deccan in Kurnool, Sandúr and Mysore; W. Gháts, common in evergreen forests up to 4,000 ft., especially in the Nilgiris and Anamalais.

Often planted for ornament, or in avenues, or for its wood.
The Toon tree.

A large and beautiful tree with pinnate leaves, lanceolate long acuminate leaflets, a reddish-brown bark and even-grained red soft scented wood, useful for building and furniture, sugar-boxes, etc. Vern. *Hind.* Tún; *Ur.* Mahalimbu; *Tam.* Santhana vembu, Thevatharam; *Mal.* Mathagiri vembu; *Kan.* Tundu.

Var. *latifolia*, C. DC. in Rec. Bot. Surv. Ind. iii. 365, with larger and wider leaflets, rounded at the base but finally acute, the margins often somewhat crenate.

W. Gháts in the Nilgiris and Anamalais, at about 6,000 ft.

A large tree and a fairly well-marked variety.

Swietenia Mahagoni, Linn., the Mahogany tree of the W. Indies, is sometimes found in gardens and avenues, and has been planted in some forest localities for its timber.

Family XXXIX. DICHAPETALACEAE, Engler.

Small trees or shrubs. *Leaves* alternate, simple, entire; stipules 2, deciduous. *Flowers* small, unisexual or polygamous, rarely hermaphrodite, in corymbose cymes; peduncles sometimes adnate to petiole. *Sepals* 5, free or connate, often unequal, imbricate. *Petals* 5, free, subperigynous, notched or bifid, with often an inflexed plate adnate to their faces. *Stamens* 5, subperigynous; filaments free or adnate to the petals; anthers oblong, connective often thickened behind, dehiscence longitudinal. *Disk* of 5 glands or scales or a 5-glandular or -lobed cup. *Ovary* free, 2-3-celled; ovules in collateral pairs, pendulous from the apex of each cell, anatropous. *Fruit* a pubescent drupe, oblong or compressed or didymous; epicarp sometimes dehiscent and disclosing the putamen; putamen 1-3-celled, the cells 1-seeded. *Seeds* pendulous; testa membranous; albumen 0; cotyledons thick; radicle small, superior.

Dichapetalum, Dup. Thouars.

Trees or shrubs. *Flowers* polygamo-monoecious. *Sepals* 5, unequal, connate at the base. *Petals* 5, 2-fid. *Stamens* 5, slightly adnate at base to the petals. *Disk* of 5 quadrate scales, placed opposite the petals. *Ovary* 2-3-celled. *Fruit* a 1-2-celled, subdidymous drupe with 1-2-seeded stone,

DICHAPETALUM GELONIOIDES, Engl. *Chaitletia gelonioides*, Bedd.; F. B. I. i. 570.

W. Gháts from S. Canara to Anamalais and Travancore, up to 4,000 ft.

A small tree with elliptic or elliptic-lanceolate leaves reaching 6 in. long by 2 in. broad and usually a transversely oblong or obcordate drupe with a soft grey epicarp, scarlet fleshy mesocarp and crustaceous endocarp, enclosing 2 seeds with fleshy cotyledons.

Family XL. OLACACEAE.

Trees or shrubs, sometimes straggling or climbing. *Leaves* usually alternate, entire; stipules 0. *Flowers* small, hermaphrodite. *Calyx* small, sometimes accrescent. *Petals* 5-6, free or slightly connate at base. *Stamens* as many as and opposite to or twice as many as the petals, sometimes with as many or twice as many staminodes alternate with them. *Disk* usually embracing the base of the ovary. *Ovary* free, 1-5-celled; style simple; ovules solitary or 2-3 in each cell. *Fruit* a 1-seeded drupe; albumen copious, fleshy; embryo minute, near the apex of the albumen.

Stamens twice as many as the petals, staminodes 0; erect thorny shrubs or small trees 1. **Ximenia.**

Stamens as many as the petals:—

Staminodes present:—

Staminodes slender, bifid, usually twice as many as the generally 3 stamens; straggling often thorny shrubs 2. **Olax.**

Staminodes short, thick, as many as the stamens; climbing shrubs with tendrils.....3. **Erythralum.**

Staminodes absent; trees:—

Calyx adherent to the fruit; anthers oblong, incurved, filaments very short 4. **Strombosia.**

Calyx not adherent to the fruit; anthers globose, very small, filaments slender 5. **Anacolosa.**

1. **Ximenia**, Linn.

Shrubs or small trees with spinous branches. *Leaves* alternate, simple, entire, shortly petioled. *Flowers* usually hermaphrodite, rather large, racemose. *Calyx* small, 4-5-lobed. *Petals* 4-5, valvate, bearded within, reflexed. *Stamens* twice as many as

petals, hypogynous; anthers erect, linear, 2-celled, dehiscing in opposite longitudinal clefts. *Staminodes* 0. *Ovary* superior, sessile, 3-4-celled; style columnar; stigma simple; ovule solitary in each cell, pendulous, anatropous. *Fruit* an ovoid 1-celled fleshy drupe; stone solitary, putamen crustaceous, 1-seeded. *Seed* with copious albumen, embryo very small.

XIMENIA AMERICANA, Linn.; F. B. I. i. 574; W. & A. 89.

N. Circars, in dry forests in Vizagapatam and Godavari; Deccan, in dry forests on stony ground, common in the Sandur Hills of Bellary and Walayar Hills of Coimbatore.

A large thorny shrub with small ovate obtuse leaves, bright orange-scarlet edible fruit and yellowish-red hard close-grained wood. Vern. Tel. Uranechra; Tam. Chiru-illantai.

2. Olax, Linn.

Trees or shrubs, often climbing, sometimes armed. *Leaves* alternate, simple, petioled. *Flowers* in axillary racemes or panicles, sometimes solitary, minutely bracteate. *Calyx* minute, cupular, truncate or obscurely toothed, enlarged in fruit. *Petals* hypogynous, valvate, free or more or less connate, usually 3 two deeply or entirely bifid one entire. *Stamens* usually 3 fertile, attached opposite to the petals at or near the base alternate with 6 bifid staminodes; anthers oblong, 2-celled, dehiscing longitudinally. *Ovary* free, more or less 3-celled, its base surrounded by a shallow hypogynous disk; style simple; stigma 3-lobed; ovules 3, pendulous from the tip of a central placenta. *Fruit* a drupe more or less enclosed in the accrescent calyx; stone crustaceous, 1-celled, 1-seeded. *Seed* inverse; albumen copious; embryo minute near the apex of the albumen, radicle superior.

Small tree; branchlets angled, transversely ridged, glabrous, yellow; leaves ovate-acuminate, 2-3 in. long, glabrous; flowers .25 in. long in small axillary racemes .5 in. long; drupe .4 in. long, less than half covered by the enlarged calyx 1. *zeylanica*.

Climbing shrubs; drupe at least three-quarters covered by the enlarged calyx:—

Old wood armed with stout curved thorns; branchlets terete, olive-coloured, pubescent; leaves obtuse, puberulous beneath, 2-5 in. long; flowers .3 in. long, in racemes up to 2 in. long; drupe .4 in. long

2. *scandens*.

Unarmed; branchlets glabrous, brown, often prominently lenticellate;

leaves ovate or lanceolate, acute or acuminate, 2-5 in. long; flowers 4 in. long in racemes or short panicles under 1 in. long; drupe up to 7 in. long 3. *Wightiana*.

Erect unarmed undershrub; leaves narrow, about 1.5 in. long by .25 in. ~~wide~~; flowers solitary, about 2 in. long; drupe small, globose...4. *nana*.

1. *OLAX ZEYLANICA*, L.; F. B. I. i. 576; W. & A. 88.

Peninsula (Wight 302).

An erect shrub or small tree.

2. *OLAX SCANDENS*, Roxb.; Roxb. Cor. Pl. ii. t. 102; F. B. I. i. 575; W. & A. 89.

N. Circars, Deccan and Carnatic, usually in ravines and near streams.

A rambling or climbing shrub of considerable size, the thorns on old wood. Wood yellowish-white, soft. Vern. *Ur.* Boderia; *Tel.* Kurpodur; *Tam.* Kadalranchi; *Mar.* Harduli.

3. *OLAX WIGHTIANA*, Wall.; F. B. I. i. 575; W. & A. 89.

W. Gháts, in the Anamalai, Pulney and Tinnevely Hills.

A small tree (Bedd.) or climbing shrub with many branches, and usually ovate obtusely acute olive-brown leaves (when dry).

Var. *nigrescens*, Gamble. Leaves lanceolate, acuminate, usually nearly black when dry, branchlets with prominent lenticels.

W. Gháts in the Anamalai Hills (Barber), Sivagiri Hills (Wight).

4. *OLAX NANA*, Wall.; F. B. I. i. 576.

N. Circars, at Karaka Konda, Vizagapatam (Barber).

A small undershrub giving herbaceous shoots from a woody rootstock, and growing up yearly like those of *Grewia sapida* and similar plants when killed down by fire or other causes.

3. *Erythropalum*, Blume.

Climbing cirrhose shrubs. Leaves alternate, entire, 3-ribbed, petiolate; tendrils axillary. Flowers small, in lax axillary cymes with filiform peduncles and pedicels. Calyx adherent, 4-5-lobed. Petals 5, valvate. Stamens 5, opposite to and inserted on the petals; filaments very short; anthers incurved, 2-celled, the cells opening longitudinally; connective thick. Staminodes 5, alternate

with the stamens. *Ovary* half immersed in the disk, 1-celled; style short, conical; stigma minute, 3-lobed; ovules 1-3, pendulous from the apex of the cell. *Fruit* an oblong or obovoid drupe, surmounted by the remains of the calyx; putamen crustaceous. *Seed* pendulous; albumen copious, fleshy; embryo minute.

ERYTHROPALUM POPULIFOLIUM, Mast.; F. B. I. i. 578.

W. Gháts in Malabar, Anamalais and Tinnevelly Hills, at low elevations.

A climbing shrub with long-petioled poplar-like subpeltate leaves, usually with 3 prominent ribs and 2 smaller basal ones; the fruit oblong-obovoid, yellowish, 7 in. long.

4. *Strombosia*, Blume.

Evergreen trees or shrubs, usually glabrous. *Leaves* alternate, simple, entire, coriaceous. *Flowers* small, regular, hermaphrodite, in axillary cymes. *Calyx* cupshaped, more or less 5-lobed. *Petals* 5, free, valvate, hairy within. *Stamens* 5, opposite the petals and adnate to them; anthers 2-celled, introrse. *Staminodes* 0. *Ovary* inferior or superior, imperfectly 4-5-celled, surrounded by a lobed disk; ovules 4-5, pendulous from a central placenta; style short. *Fruit* a drupe, surmounted by the remains of the calyx-lobes and style; stone crustaceous. *Seed* pendulous; albumen copious, fleshy; embryo minute.

STROMBOSIA CEYLANICA, Gardn.; F. B. I. i. 579; Bedd. Fl. t. 137.

W. Gháts, from S. Canara southwards, especially in Travancore, but always scarce.

A large tree with oblong-lanceolate leaves up to 6 in. long by 2 in. broad, very small flowers and a pyriform purple drupe about 1 in. long.

5. *Anacolosa*, Blume.

Trees or shrubs. *Leaves* alternate, simple, entire, petiolate. *Flowers* in axillary cymes. *Calyx* cupshaped, 5-7-lobed. *Petals* 5-6, free, valvate, hairy within. *Stamens* as many as and opposite to the petals at their base; filaments slender; anthers very small, globose, basifixed, the 2 cells dehiscing longitudinally. *Staminodes* 0. *Disk* cupshaped, surrounding the base of the ovary. *Ovary* 1-celled; style conical; stigma shortly lobed; ovules 2-3, pendulous from a central placenta. *Fruit* a drupe

surrounded by the accrescent disk; stone crustaceous, 1-seeded. *Seed* pendulous; albumen fleshy; embryo minute; radicle superior, thicker than the cotyledons.

ANACOLOSA DENSIFLORA, Bedd.; F. B. I. i. 580; Bedd. Fl. t. 158.

... Ghâts in the Anamalai and Travancore Hills, up to 2,500 ft.

A lofty straight-stemmed tree with oblong leaves up to 6 in. long and 2 in. broad, and many fragrant white flowers. Wood reddish-brown, moderately hard. Vern. Tam. Katta ockkali; Mal. Kal manikkam.

Family XLI. OPILIACEAE.

Trees or erect or climbing shrubs. *Leaves* alternate, entire. *Flowers* hermaphrodite or dioecious, small, in axillary spikes or racemes. *Calyx* small or minute, obscurely 4-5-lobed. *Petals* 4-5, free or connate in a gamopetalous corolla. *Disk* fleshy entire or of glands as many as the petals and alternate with them. *Stamens* as many as the petals and opposite to them. *Ovary* 1-celled; ovule 1, pendulous. *Fruit* a drupe. *Seed* 1; albumen fleshy; embryo imbedded in the albumen, cotyledons linear, sometimes 3, sometimes combined; radicle superior.

Petals free; flowers in bracteate racemes 1. *Opilia*.

Petals combined in a gamopetalous corolla; flowers in spikes

2. *Cansjera*.

1. *Opilia*, Roxb.

Low trees or climbing shrubs. *Leaves* alternate, entire, penninerved. *Flowers* small, 1-3 together in the axils of peltate deciduous bracts, in axillary racemes, the racemes in bud cone-like. *Calyx* minute, annular, obscurely 5-lobed. *Petals* 5, oblong, valvate. *Disk* of 5 fleshy clubshaped glands alternate with the petals. *Stamens* 5, opposite the petals, filaments slender; anthers small, 2-celled. *Ovary* superior, oblong; style very short; ovule solitary, pendulous. *Fruit* a drupe with fleshy pericarp and thin stone. *Seed* large; albumen copious, fleshy; embryo linear in the centre of the upper part of the albumen; cotyledons joined together, long; radicle superior.

OPILIA AMENTACEA, Roxb. Cor. Pl. iii. t. 158; F. B. I. i. 583; Wt.

Ill. t. 40. *Ximenia* ? *olacioides*, W. & A. 89.

A rather scarce weak climbing shrub with pale brown branch-

lets and lanceolate leaves up to 4 in. long; racemes slender, up to 1.5 in. long; drupe oblong, glaucous-green.

N. Circars, Deccan and Carnatic, in hilly country especially; W. Gháts, on the lower slopes of the Anamalais and Pulneys, eastern side.

2. Cansjera, Juss.

Climbing shrubs, sometimes armed. *Leaves* alternate, entire, penninerved. *Flowers* in short axillary spikes, hermaphrodite, bracteolate. *Calyx* very minute, 4-lobed. *Corolla* regular, tubular or urceolate, with 4-5 usually reflexed lobes; lobes valvate. *Disk* of 4-5 triangular fleshy glands alternate with the corolla-lobes. *Stamens* 4-5, opposite the corolla-lobes; filaments slender, free, between the glands of the disk; anthers small, 2-celled. *Ovary* superior, ovoid-conical, 1-celled; style cylindric; stigma capitate, 4-lobed; ovule solitary, pendulous. *Fruit* a drupe with a crustaceous putamen. *Seed* solitary, erect; albumen copious, fleshy; embryo small, at the upper end, cotyledons 2-3, radicle superior.

CANSJERA RHEEDII, Gmel.; F. B. I. i. 582; Wt. Ic. t. 1861. *C. scandens*, Roxb. Cor. Pl. t. 103.

N. Circars, Deccan and Carnatic, in hilly country chiefly; W. Gháts, on the eastern slopes, from Mysore to Tinnevely.

A climbing shrub with occasional curved thorns on the shining brown lenticellate branches; branchlets greenish, pubescent; leaves ovate-lanceolate, dull, thinly coriaceous, up to 8 in. long; spikes about 1 in. long; drupe orange-red, smooth.

Family XLII. ACACINACEAE.

Trees or shrubs often climbing. *Leaves* alternate, rarely opposite; usually entire but sometimes toothed; stipules 0. *Flowers* usually small, hermaphrodite polygamous or dioecious; inflorescence various; often articulate under the calyx. *Calyx* small, 5- (rarely 4- or 6-) lobed or partite, sometimes 0. *Petals* 5 (rarely 4 or 6), usually free, sometimes connate, valvate. *Stamens* as many as the petals and usually alternate with them, sometimes alternating with staminodes, in ♂ flowers often reduced to staminodes. *Disk* cupshaped or 5-lobed, often wanting. *Ovary* 1-celled with 2 collateral pendulous ovules. *Fruit* usually a drupe with more or less crustaceous endocarp. *Seed* 1, pendulous, usually

albuminous, sometimes exalbuminous; cotyledons various, radicle superior.

Albumen copious:—

~~Cotyledons~~ small; petals glabrous within; erect trees or shrubs.

Filaments usually with short clubshaped hairs on the back; anthers short, pendulous; ovary erect; petals connate ...1. **Gomphandra**.

Filaments glabrous; anthers long, bipartite at base; ovary oblique; petals free 2. **Apodytes**.

Cotyledons large, foliaceous:—

Erect trees, usually hermaphrodite; petals villous within; flowers in corymbose cymes; cotyledons cordate.....3. **Mappia**.

Climbers, usually dioecious; cotyledons orbicular or elliptic:—

Leaves palminerved, dentate:—

Flowers subcapitate on supra-axillary peduncles ...4. **Miquelia**.

Flowers in pendulous extra-axillary racemes.....5. **Natsiatum**.

Leaves entire or coarsely toothed, penninerved; ♂ flowers in filiform spikes, ♀ in capitate heads 6. **Pyrenacantha**.

Albumen 0; cotyledons large, fleshy, connate; climbing shrubs with simple entire reticulate leaves and flowers in pendulous spikes

7. **Sarcostigma**.

1. *Gomphandra*, Wall.

• Small trees or shrubs. *Leaves* alternate, entire, penninerved. *Flowers* small, polygamo-dioecious, in axillary or lateral cymes. *Calyx* minute, cupshaped, 4-5-lobed. *Petals* 4-5, more or less connate into a campanulate corolla, free at apex, valvate, the lobes incurved and hooked. *Stamens* 4-5, hypogynous, alternate with the petals; filaments thick, fleshy, often connate, usually with a tuft of clubshaped hairs on the back at the apex; anthers pendulous from the interior apex of the filaments, dehiscing longitudinally. Hypogynous *disk* thick, annular or 0. *Ovary* in ♂ flowers sunk in the disk: in ♀ flowers oblong, 1-celled; style conic; stigma small or discoid; ovules 2, collateral. *Fruit* an elongate drupe, topped with the remains of the stigma, pericarp smooth, somewhat ribbed, endocarp leathery. *Seed* pendulous, longitudinally surrounded by the raphe; albumen fleshy, hollowed; embryo minute with very small cotyledons.

Leaves membranous, lanceolate, acuminate, main nerves about 6, joining in loops; inflorescence axillary; filament hairs conspicuous.

1. *polymorpha*.

Leaves subcoriaceous, very variable in shape, obtuse or obtusely acute, main nerves about 4, irregular, not obviously joining in loops; inflorescence usually leaf-opposed rarely axillary; filament hairs few or none.

2. *coriacea*.

1. *GOMPHANDRA POLYMORPHA*, Wt. Ill. 103; F. B. I. i. 583, *in part*.
W. Gháts, in Wynaad, Nilgiris and Anamalais in low-level Sholas up to 4,000 ft.
2. *GOMPHANDRA CORIACEA*, Wt. Ill. 108. *G. polymorpha*, Wt. Ic. tt. 953, 954; F. B. I. i. 586, *in part*.
W. Gháts, common in Sholas of the Nilgiris, Pulneys, Anamalais and Travancore Hills at from 3,900 to 6,000 ft.

2. *Apodytes*, E. Meyer.

Trees or shrubs. *Leaves* alternate, entire, usually turning black in drying. *Flowers* hermaphrodite, in terminal or axillary corymbose cymes. *Calyx* small, cupshaped, 5-toothed. *Petals* 5, hypogynous, free, valvate. *Disk* 0. *Stamens* 5, alternate with the petals; filaments dilated; anthers oblong, bipartite at base, 2-celled, the cells dehiscing longitudinally. *Ovary* 1-celled, obliquely gibbous; style slender; stigma small; ovules 2, pendulous, superposed. *Fruit* an obliquely ovoid compressed drupe; stone crustaceous, 1-celled, 1-seeded. *Seed* pendulous; embryo small, in the apex of fleshy albumen; cotyledons narrow.

Leaves oblong, obtuse, with revolute margins, coriaceous; petals .25 in. long; ovary hairy.....1. *Benthamiana*.
Leaves broadly ovate, acute or acuminate, with flat margins, membranous; petals .15 in. long; ovary glabrous.....2. *Beddomei*.

1. *APODYTES BENTHAMIANA*, Wt. Ic. t. 1153; F. B. I. i. 588; Bedd. Fl. t. 140, var. *a*.
W. Gháts in the Nilgiris, Anamalais, Travancore and Tinnevely Hills above 5,000 ft.
A medium-sized tree reaching 40 ft. in height.
2. *APODYTES BEDDOMEI*, Mast. in F. B. I. i. 588. *A. Benthamiana*, Bedd. Fl. t. 140, var. *β*.
W. Gháts in the evergreen forests of Nilgiris, Anamalais and Travancore up to 3,000 ft.
A medium-sized tree.

3. *Mappia*, Jacq.

Trees. *Leaves* alternate, simple, penninerved. *Flowers* hermaphrodite or polygamous in terminal corymbose cymes. *Calyx* small, 5-toothed. *Petals* 5, hypogynous, valvate, villous within, apex reflexed. *Stamens* 5, hypogynous, alternate with the petals; anthers oblong, dorsifixed, dehiscing longitudinally. *Disk* cup-shaped surrounding the ovary. *Ovary* 1-celled; style short; stigma thickened; ovules 2, pendulous, collateral. *Fruit* a drupe with thinly crustaceous more or less rugose putamen. *Seed* pendulous with dorsal raphe; albumen fleshy; embryo large with foliaceous cordate cotyledons; radicle superior.

Leaves subcoriaceous, ovate, acute at apex, rounded or subcordate and unequal at base, more or less densely stellate-tomentose beneath; petiole stout 1-1.5 in. long; drupe 5 in. long, putamen rugose, flowers fetid, rather large 1. *tomentosa*.

Leaves thickly membranous, glabrous or glabrescent; flowers medium-sized:—

Flowers not fetid; leaves ovate or obovate, abruptly acuminate, transverse nervules prominent and pale beneath; drupe 6 in. long, flattened, putamen scarcely rugose 2. *ovata*.

Flowers fetid; transverse nervules of leaves slender, not very prominent:—

Leaves elliptic-ovate or oblong, more or less puberulous beneath and pale; rounded at base; petiole under 1 in. long 3. *foetida*.

Leaves oblong or elliptic-oblong, glabrous, acute at base; petiole 1-1.5 in. long 4. *oblonga*.

Leaves thinly membranous, glabrous, pale beneath, lanceolate-oblong, acuminate both at apex and base; flowers small 5. *Wightiana*.

1. *MAPPIA TOMENTOSA*, Miers; F. B. I. i. 589.

W. Gháts, in the Nilgiri and Pulney Hills, usually above 5,000 ft.

2. *MAPPIA OVATA*, Miers; F. B. I. i. 589 *in part*.

W. Gháts, in the Nilgiri, Anamalai, Pulney and Tinnevely Hills.

3. *MAPPIA FOETIDA*, Miers; F. B. I. i. 589. *Stemonurus?* *foetidus*, Wt. Ic. t. 955.

W. Gháts, in the Nilgiri Hills up to 7,000 ft.

A tree with greenish-grey bark and white soft wood.

4. *MAPPIA OBLONGA*, Miers; F. B. I. i. 589.

W. Gháts, in Wynad and Malabar, up to 4,000 ft.

5. *MAPPIA WIGHTIANA*, Miers. *M. ovata*, Miers; F. B. I. i. 589 in part.

W. Coast, in Malabar and Travancore, at low levels.

4. *Miquelia*, Meissn.

Climbing shrubs. *Leaves* alternate, simple, membranous, palminerved. *Flowers* dioecious, subcapitate, with supra-axillary peduncles, ♂ capitate in racemes, ♀ solitary. *Calyx* minute, 4-5-lobed. *Petals*: ♂ connate in a long pedicel-like tube, limb 4-5-lobed, lobes valvate, the tips inflexed; ♀ free or nearly so, at length reflexed. *Stamens* 4-5, alternate with the corolla-lobes, filaments short, in ♀ reduced to staminodes. *Ovary* sessile, 1-celled; style short; stigma dilated, cupular; ovules 2, pendulous from the apex of the cell. *Fruit* an oblong, more or less compressed, drupe; stone crustaceous, tubercled within. *Seed* pendulous; albumen fleshy; embryo with flat elliptic leafy cotyledons.

MIQUELIA DENTATA, Bedd.; F. B. I. i. 593

W. Gháts, in the Anamalais (Beddome).

A climbing shrub with ovate-oblong or lanceolate acuminate membranous dentate leaves, sharply acuminate at apex, 3-ribbed at base, apparently very rare.

5. *Natsiatum*, Ham.

Climbing subherbaceous shrub. *Leaves* alternate, simple, palmately nerved. *Flowers* dioecious, very small, in pendulous extra-axillary racemes. *Calyx* deeply 5-lobed, persistent. *Petals* 5, free or connate at the base. *Stamens* 5, alternate with the petals and also with 5 2-lobed staminodes; filaments short; anthers sagittate, apiculate, opening longitudinally: in ♀ replaced by compressed glands. *Ovary* sessile, 1-celled; style short, 2-3-lobed at apex; stigmas capitate; ovules 2 collateral, pendulous. *Fruit* an obliquely ovoid compressed black drupe; stone crustaceous, 1-celled. *Seed* solitary; albumen fleshy, embryo with leafy orbicular cotyledons.

NATSIATUM HERPETICUM, Ham.; F. B. I. i. 595.

N. Circars, Mahendragiri Hill in Ganjam at 3,000 ft. (Gamble).

A soft climber with long-petioled cordate dentate leaves and slender whitish racemes of minute flowers.

6. *Pyrenacantha*, Hook.

Climbing shrubs. *Leaves* alternate, entire or coarsely toothed, penninerved. *Flowers* minute, dioecious, ♂ in filiform axillary spikes, ♀ in capitate heads, monochlamydeous. *Perianth* deeply 4-lobed, lobes oblong, inflexed at tip. *Stamens* ♂, alternate with the perianth-lobes; filaments short; anthers small, dehiscing longitudinally. *Ovary* in ♂ a villous pistillode in ♀ oblong, 1-celled; style 0; stigma sessile with many radiating branches; ovules 2, pendulous, collateral. *Fruit* a drupe with thin stone provided on the inner surface with numerous obtuse horizontal spines penetrating the albumen. *Seed* solitary; albumen fleshy; cotyledons large, foliaceous.

PYRENACANTHA VOLUBILIS, Hook. Bot. Misc. ii. 108; Wt. Ill. Suppl. tt. 9. 10.

W. Ghâts, in the Pulney Hills (Bourne) and Hills of Tinnevely (Beddome, etc.).

A much-branched climbing shrub with slender branchlets, narrowly rhomboid lanceolate leaves, 3-5 in. long with a pair of glands at the base, male flowers in filiform spikes, female in pedunculate capitate heads, drupe ovoid orange-red.

7. *Sarcostigma*, W. & A.

Climbing shrubs. *Leaves* alternate, simple. *Flowers* dioecious, minute, in distant sessile fascicles on elongate interrupted pendulous lateral spikes. *Calyx* cupshaped, unequally 4-6-lobed. *Petals* 4-6, free or united at base into a short tube, valvate, at length reflexed. *Stamens* 4-6, hypogynous, alternate with the petals; filaments slender; anthers versatile: in ♀ reduced to short subulate staminodes. *Ovary* in ♂ conical, ovules none; in ♀ sessile, 1-celled, superior; stigma umbonate, sessile; ovules 2 pendulous from the apex of the cell with thickened funicle. *Fruit* an oblong somewhat flattened drupe with woody putamen. *Seeds* pendulous; albumen 0; cotyledons fleshy, connate; radicle small, superior.

ARCOSTIGMA KLEINII, W. & A.; F. B. I. i. 594; Wt. Ic. t. 1854.

W. Gháts, in the Wynad, Anamalais and Travancore Hills, at low elevations.

A climbing shrub with entire coriaceous oblong-lanceolate leaves up to 10 in. long, prominently reticulate, slender flowering spikes and drupe 1-1.5 in. long.

Family XLIII. AQUIFOLIACEAE.

Trees or shrubs. Leaves alternate, simple, usually coriaceous and evergreen; stipules 0 or 2 minute. *Flowers* regular, small, usually dioecious, ♂ with imperfect ovary, ♀ with imperfect stamens, in axillary cymes fascicles or umbels. *Calyx* persistent, 6-lobed, the lobes imbricate. *Petals* 4-5, rarely more, connate or free in both ♂ and ♀ or in ♂ only, deciduous, imbricate. *Stamens* isomerous with the petals and alternate with them, attached on the base of the corolla; filaments subulate; anthers linearly oblong, dorsifixed. *Disk* 0. *Ovary* free, 3-6—or rarely 2—celled; ovules 1 or 2 in each cell, collateral, pendulous; style 0 or very short; stigma capitate or discoid. *Fruit* a drupe with 2 or more, 1-seeded, free or connate, stones. *Seed* with a membranous testa; albumen copious, fleshy; embryo minute.

Ilex, Linn.

Trees or shrubs. *Calyx* 4-6-lobed. *Corolla* rotate, petals 4-6, free or connate at the base. *Stamens* isomerous with the petals, alternating to the base of the corolla in ♂, imperfect and often hypogynous in ♀. *Ovary* subglobose, 2-12-celled; stigmas free (usually so in ♂ but ovary imperfect) or confluent on the top of the ovary. *Drupe* usually globose with 2-12 stones; pericarp thick, bony, often grooved.

Leaves entire or rarely with few serratures near the apex, subcoriaceous or most membranous:—

Flowers usually 6-merous; leaves acute at apex; drupe .15 in. in diam., tipped by prominent stigmas; large tree.....1. *malabarica*.
Flowers usually 5-merous; leaves coriaceous:—

Leaves elliptic-obovate, 1-2 in. long, mucronate or emarginate at apex, pale beneath, the midrib prominently impressed; small tree with sessile umbellules.....2. *Thwaitesii*.

Leaves elliptic or elliptic-oblongate, acuminate at apex, narrow at base, 2-3 in. long, the midrib slightly impressed; large tree with subsessile umbellules 3. *Wightii*
 Leaves ovate-lanceolate, long-acuminate at apex, rounded at base, 2-3 in. long, the midrib slightly impressed; shrub with peduncles about 5 in. long.....4. *Gardneri*
 Leaves denticulate-serrate, coriaceous, elliptic, 2-4 in. long; flowers usually 4-merous, ♀ larger than ♂; large tree.....5. *denticulata*

1. *ILEX MALABARICA*, Bedd. Fl. t. 143; F. B. I. i. 600.

W. Gháts, in Wynnad and lower Nilgiris, Anamalais and Pulneys at about 3,000 ft.

A large tree.

2. *ILEX THWAITESII*, Loesener. *I. Walkeri*, Wt. & Gardner, F. B. I. i. 600 in part.

W. Gháts, in the Pulney Hills.

A small densely branched tree, with small leaves.

3. *ILEX WIGHTIANA*, Wall.; F. B. I. i. 603; Wt. Ic. t. 1216.

W. Gháts, common in the Sholas of the Nilgiri Hills at 6,000-8,000 ft., less so southwards to the Hill Travancore.

A large handsome tree with white flowers and red berries. Wood greyish-white, soft but useful in building and turnery. Vern. *Badaga* Horralu, *Tam.* Velloday.

4. *ILEX GARDNERIANA*, Wt. Ic. t. 1217; F. B. I. i. 603.

W. Gháts, in the Nilgiri Hills about Sispara, 6,000 ft. scarce.

A small tree or large shrub.

5. *ILEX DENTICULATA*, Wall.; F. B. I. i. 600; Wt. Ill. t. 1216. Bedd. Fl. t. 142.

W. Gháts, Sholas of the Nilgiris, Anamalais and Pulneys at 6,000-8,000 ft.

A large tree, conspicuous in Nilgiri Sholas, by denticulate leaves and rather large drupes. Wood soft, apt to warp and shrink.

