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FLORA

OF THE

PRESIDENCY OF MADRAS

J. S. GAMBLE

VOL. II.

RUBIACEAE TO EUPHORBIACEAE.

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

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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 IV

RUBIACEAE TO *EBENACEAE.*

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

London

1921

INTRODUCTION TO PART IV.

THIS Part ends with the description of the genus Diospyros; the key to the species and their enumeration will begin Part V.

I think it well here to draw attention to Supplementary Notes which are being published, from time to time, in the 'Kew Bulletin.' The following have already appeared:

No. I, by Mr. S. T. DUNN, 1916, p. 57;

No. II, by Mr. J. S. GAMBLE, 1918, p. 222;

No. III, by Mr. J. S. GAMBLE, 1920, p. 49.

Others will appear by degrees.

J. S. GAMBLE.

Liss: June, 1921.

Fam. LXXXIII. RUBIACEAE.

Trees shrubs or herbs, erect prostrate or climbing. *Leaves* opposite or whorled, entire; stipules various, inter- or intra-petiolar, sometimes united together or to the leaves, entire toothed or setose, very rarely 0. *Flowers* hermaphrodite, rarely unisexual, usually regular, the inflorescence various. *Calyx*-tube adnate to the ovary; limb various. *Corolla* regular, gamopetalous; lobes 4–5, valvate imbricate or contorted. *Stamens* as many as the corolla lobes, inserted on its mouth or tube; filaments short or long; anthers 2-celled. *Disk* epigynous, usually annular or cushion-shaped. *Ovary* inferior, 2–10-celled; ovules 1 or more in each cell; style simple or cleft; stigmas various. *Fruit* 2–10-celled, a berry drupe or capsule or of separating cocci. *Seeds* various; albumen fleshy or horny; cotyledons flat or semi-terete; radicle superior or inferior.

Ovules, with few exceptions, more than 2, usually numerous, in each cell:—

Flowers collected in dense globose heads:—

Trees or shrubs:—

Calyx-tubes fused into a fleshy mass; ovary 2-celled; stigma fusiform ....1. **Naucleа.**

Calyx-tubes not fused into a fleshy mass:—

Corolla-lobes imbricate; flowers ebracteolate:—

Stigma fusiform; seeds not winged ... . 2. **Anthocephalus.**

Stigma globose; seeds winged .....3. **Neonaucleа.**

Corolla-lobes valvate; flowers bracteolate:—

Stigma clavate; calyx-limb 5-lobed.....4. **Adina.**

Stigma mitriform; calyx-limb truncate .....5. **Mitragyna.**

Climbing shrubs with peduncles sometimes transformed into hooks ....6. **Uncaria.**

Flowers not usually collected in dense globose heads:—

Fruit capsular, 2- rarely 4-celled:—

Corolla-lobes twisted in bud, imbricate .....7. **Wendlandia.**

Corolla-lobes valvate :—
Seeds winged ; flowers in terminal panicles :—
Capsule loculicidal; flower panicles with foliaceous reticulate petioled bracts ; corolla-lobes glabrous
8. **Hymenodictyon.**
Capsule septicidal; no foliaceous bracts ; corolla lobes with pilose margins.....**Cinchona.**
Seeds not winged :—
Corolla-lobes toothed on each side .....9. **Dentella.**
Corolla-lobes entire :—
Anthers connivent, dehiscing by apical pores ; corolla rotate :—
Stigma 1, capitate ; small herbs with thin leaves and small stipules .....10. **Argostemma.**
Stigmas 2, capitate ; large herbs with large leaves and large, usually bifid stipules .....11. **Neurocalyx.**
Anthers not connivent, dehiscing laterally :—
Calyx-teeth 4 ; capsule septi- or loculi-cidal or indehiscent :—
Seeds numerous, minute, angular or rounded ; testa reticulate or pitted .....12. **Oldenlandia.**
Seeds few, plano-convex or globose with a ventral cavity .....13. **Anotis.**
Calyx-teeth 5 ; capsule obcordate, of 2 compressed lobes, loculicidal above the calyx .....14 **Ophiorrhiza.**
Fruit a fleshy berry :—
Corolla-lobes valvate in bud ; seeds many :—
Inflorescence terminal :—
Calyx with 1 lobe usually forming a coloured leaf
15. **Mussaenda.**
Calyx-lobes 5, slender, no coloured leaf ...16. **Acranthera.**
Inflorescence axillary ; calyx 4–7-lobed :—
Cymes loose and spreading ; leaves large, membranous
17. **Mycetia.**
Cymes close ; leaves small, nearly coriaceous
18. **Urophyllum.**
Corolla-lobes imbricate ; inflorescence terminal ; corolla-tube long, cylindric .....**Hamelia.**
Corolla-lobes twisted in bud :—
Inflorescence terminal :—
Flowers bisexual .....19. **Chomelia.**
Flowers dioecious .....20. **Byrsophyllum.**

Inflorescence usually axillary :—
Ovary 2-celled .....21. **Randia.**
Ovary 1-celled .....22. **Gardenia.**
Ovary 2-3-celled, flowers in axillary clusters 23. **Tricalysia.**
Ovules 2 in each cell, 1 pendulous, 1 erect ..... 24. **Scyphiphora.**
Ovules usually solitary in each cell :—
Radicle superior :—
Corolla-lobes valvate in bud :—
Fruit of 2 mericarps separating from a columella ; herbaceous plants..... 25. **Knoxia.**
Fruit a drupe with 2 many free or cohering pyrenes ; shrubs or trees :—
Ovary 2-celled ... .26 **Plectronia.**
Ovary 3–5-celled... .....27. **Vangueria.**
Corolla-lobes twisted in bud ; ovary 1-celled, 1–2-ovuled 28. **Octotropis.**
Radicle inferior :—
Corolla-lobes twisted in bud :—
Flowers in panicles or corymbs, no calyculus :—
Flowers 4-merous ; style glabrous :—
Bracts coriaceous, not sheathing ; style 2-branched ; leaves thick .....29. **Ixora.**
Bracts membranous, lower sheathing ; style entire ; leaves thin .....30. **Pavetta.**
Flowers 5-merous; style often hairy ; leaves leathery 31. **Stylocoryne.**
Flowers solitary or in axillary fascicles ; calyculus single or double... 32. **Coffea.**
Corolla-lobes valvate in bud :—
Ovules basal :—
Style short ; fruit a drupe with 2 or more pyrenes :—
Inflorescence terminal, corymbose or panicled, rarely capitate :—
Corolla usually short and straight .....33 **Psychotria.**
Corolla usually curved ..... 34. **Chasalia.**
Inflorescence capitate or fascicled, axillary or terminal : —
Creeping herbs with cordate leaves .....35. **Geophila.**
Erect herbs with narrow leaves ....36. **Fergusonia.**
Erect shrubs with distichous leaves.....37. **Lasianthus.**
Flowers solitary or few , fetid shrubs.....38. **Saprosma.**
Style long ; fruit a capsule .....39. **Hamiltonia.**
Ovules on the septum :—

Trees or shrubs; stipules undivided :—
Flowers sessile, in capitate heads, the calyx-tubes confluent.....40. **Morinda.**
Flowers pedicelled, the calyx-tubes not confluent
41. **Prismatomeris.**
Herbs or undershrubs; stipules connate :—
Fruit large, indehiscent, 2-celled; fleshy coast herb; stipules entire or toothed .....42. **Hydrophylax.**
Fruit small, dehiscing in 2 cocci; erect or prostrate herbs or undershrubs; stipules pectinate... .....43. **Borreria.**
Herbs with whorled leaves; without stipules, or stipulate only when leaves opposite :—
Corolla 5-merous; fruit fleshy.....44. **Rubia.**
Corolla 4-merous; fruit dry .....45. **Galium.**

1. **Nauclea,** Linn. emend.

Trees or shrubs. *Leaves* petioled; stipules persistent or caducous. *Flowers* crowded in globose, usually solitary, terminal, pedunculate heads, the calyx-tubes fused into a fleshy mass with the receptacle; bracts stipular; bracteoles 0. *Calyx*-lobes 4–5, persistent or caducous. *Corolla*-tube long, funnel-shaped, the throat glabrous; lobes 4–5, imbricate. *Stamens* 4–5, on the throat of the corolla, subsessile; anthers ovate, acute. *Ovary* 2-celled; ovules very many, imbricate, on pendulous placentas; style long; stigma fusiform. *Fruit* a fleshy globose mass of 2-celled pyrenes with very thin septa. *Seeds* few in each cell, ovoid, imbricate, not winged; testa crustaceous, usually pitted; albumen fleshy; embryo rather large, radicle inferior.

NAUCLEA MISSIONIS, W. & A. 392; F. B. I. iii. 27.
W. Coast, in Malabar and Travancore, up to 1,500 ft., on river banks.
A small evergreen tree with elliptic-lanceolate, glabrous, shining leaves up to 5 in. long and yellowish-white fragrant flowers. Bark smooth; wood dark yellow, moderately hard. Vern. *Tam. Mal.* Attu vanji.

Nauclea orientalis, Linn. (*Sarcocephalus cordatus*, Miq.; F. B. I. iii. 22) is a large tree native of Ceylon and elsewhere, sometimes planted in gardens in Madras.

2. Anthocephalus, A. Rich.

Trees; branchlets thick, terete. *Leaves* petioled, ovate; stipules lanceolate, caducous. *Flowers* crowded in terminal, peduncled, globose, solitary heads; bracts stipular, at the base of the peduncle; bracteoles 0. *Calyx*-tubes closely pressed together but not fused, 5-lobed. *Corolla*-tube long, funnel-shaped, throat glabrous; lobes 5, imbricate. *Stamens* 5, on the throat of the corolla; filaments short; anthers ovate-sagittate, apiculate. *Ovary* 4-celled above, 2-celled below; ovules very many, horizontal, on 2 bifid placentas which ascend from the septum and send arms into the upper cells; style filiform, exserted; stigma fusiform. *Fruit* a fleshy orange globose enlarged receptacle on which the capsules are embedded, the capsules having, under the thin envelope, 4 crustaceous caps to the upper part, the lower part membranous and fragile. *Seeds* many, angular; testa muriculate; albumen fleshy; embryo minute with rounded cotyledons, radicle superior, cylindric.

ANTHOCEPHALUS INDICUS, A. Rich. *A. Cadamba*, Miq.; F. B. I. iii. 23. *Nauclea Cadamba*, Roxb.; Bedd. Fl. t. 35.

N. Circars, along river banks; Deccan, in Kurnool and Cuddapah; W. Coast and W. Ghâts, at low levels in wet places up to 1,500 ft., frequently cultivated for ornament.

A large deciduous tree with clean cylindrical stem and horizontal branches, the leaves reaching 1 ft. in length and 6 in. in breadth and often pubescent beneath, the fragrant flowers in handsome large globular orange heads with white stigmas, the fruit yellowish, fleshy. Bark dark grey; wood white or yellowish, soft and even-grained, but little used. Vern. *Hind.* Kadam; *Ur.* Kadambo; *Tel.* Kadambe; *Tam.* Vella cadambu; *Mal.* Attu ték, Kodavara.

3. Neonauclea, Merr.

Trees or shrubs. *Leaves* sessile or petioled; stipules entire, flat, deciduous. *Flowers* crowded in globose, solitary or subpanicled, peduncled heads; bracts large, caducous; bracteoles setiform, glabrous, or 0. *Calyx*-tube prism-shaped; lobes 5, linear or triangular subulate, often with valvate processes at the apex. *Corolla* tube funnel-shaped; lobes 5, imbricate. *Stamens* 5, on the throat of the corolla; anthers oblong or

linear. *Ovary* 2-celled; ovules numerous in each cell on pendulous placentas; style long, thickened; stigma globose. *Fruit* a globose receptacle bearing capsules each of 2 cocci, usually separating from a persistent axis. *Seeds* imbricate, elongate, flattened; testa striate, winged, the upper wing 2-horned, the lower acuminate; albumen fleshy.

NEONAUCLEA PURPUREA. Merr. in Interp. Rumph. Herb. Amb. 483. *Nauclea purpurea*, Roxb. Cor. Pl. t. 54; F. B. I. iii. 26; W. & A. 391 *in part*. *N. elliptica*, Bedd. Ic. t. 19.

N. Circars, hills of Godavari at 2,000 ft., in moist valleys; Deccan, hills of Coimbatore; W. Ghâts, from S. Canara to Malabar, up to 3,000 ft.

A small tree with elliptic-lanceolate acute leaves up to 8 in. long and heads of purple flowers. Wood light red, smooth, even-grained. Vern. *Kan.* Ahnan; *Tel.* Bagada.

4. Adina, Salisb.

Trees or shrubs; branchlets terete. *Leaves* petioled, ovate-lanceolate or cordate; stipules large, caducous. *Flowers* small, crowded in solitary or panicled globose peduncled heads, the receptacle with stiff hairs; bracts in pairs on the peduncle or 0; bracteoles paleaceous. *Calyx*-tube 5-angled; lobes 5. *Corolla*-tube elongate, funnel-shaped at top, the throat glabrous; lobes 5, valvate. *Stamens* 5, on the mouth of the corolla; filaments short; anthers oblong. *Ovary* 2-celled; ovules numerous, on a pendulous placenta in each cell; style filiform; stigma clavate or capitate. *Fruit* a cluster of capsules each separating into 2 follicular cocci, many-seeded. *Seeds* oblong; testa winged, reticulate; albumen fleshy; cotyledons flat; radicle superior, cylindric.

ADINA CORDIFOLIA, Hook. f.; F. B. I. iii. 25; Brand. For. Fl. t. 33. *Nauclea cordifolia*, Willd.; Roxb. Cor. Pl. t. 53; W. & A. 391; Bedd. Fl. t. 33.

All dry deciduous forests in the Circars, Deccan and Carnatic, less common in W. Ghâts, usually sporadic but occasionally gregarious on old cultivated lands.

A large and beautiful deciduous tree with orbicular-cordate abruptly acuminate large leaves, yellow flowers in rather small heads and capsular fruits with small narrow seeds

tailed above. Bark thick, grey, rough; wood yellow, moderately hard and even-grained, used for furniture, agricultural implements, combs, etc., in Coconada for cigar-boxes. Young trees are often cut for house-posts. Vern. *Hind.* Haldu; *Ur.* Holonda; *Tel.* Bandaru; *Tam., Mal.* Manja kadambe; *Kan.* Ahnau.

5. Mitragyna, Korth.

Trees or shrubs; branchlets terete. *Leaves* petioled; stipules large, caducous. *Flowers* crowded in globose, axillary and terminal, solitary or panicled, pedunculate heads, the receptacle hirsute; bracts 2, on the peduncle, caducous, with often 2 small leaves; bracteoles many, paleaceous. *Calyx*-tube obconic, truncate or 5-toothed; limb tubular or 0. *Corolla*-tube funnel-shaped, the throat glabrous or pilose; lobes 5, valvate. *Stamens* 5, on the throat of the corolla-tube; filaments short; anthers oblong, apiculate. *Ovary* 2-celled; ovules many, imbricate, on pendulous placentas in each cell; style filiform; stigma mitriform, hollow at base. *Fruit* a globose head of capsules, each with 2 follicular cocci, many-seeded. *Seeds* flattened, testa winged, reticulate; albumen fleshy; cotyledons flattened; radicle superior.

Calyx-limb short; corolla light yellow; leaves usually obtuse. 1. *parvifolia.*

Calyx-limb elongate; corolla purple; leaves more or less acuminate 2. *tubulosa.*

1. MITRAGYNA PARVIFOLIA, Korth. *Stephegyne parvifolia*, Korth.; F. B. I. iii. 25. *Nauclea parvifolia*, Roxb. Cor. Pl. t. 52; W. & A. 396; Bedd. Fl. t. 34.

   All dry deciduous forests in the Circars, Deccan and Carnatic, less common on W. Coast, and sometimes in evergreen forests and on old cultivated lands, sporadic.

   A large deciduous tree with leaves very variable in shape and size. Bark light grey, smooth; wood light pinkish-brown, even-grained, used for furniture, implements and utensils. Vern. *Hind.* Kadam; *Ur.* Mundi-mundi; *Tel.* Nir kadambe; *Tam.* Chinna kadambu; *Mal.* Vimba; *Kan.* Kongu.

2. MITRAGYNA TUBULOSA, Hav. in Journ. Linn. Soc. xxxiii. 70.

Stephegyne tubulosa, Hook. f.; F. B. I. iii. 25. *Nauclea tubulosa*, Arn.; Bedd. Ic. t. 18.

W. Coast, in Cochin and Travancore, both in evergreen and deciduous forests, often in grassy lands at the foot of the hills.

A small deciduous tree with purple flowers and a pinkish-brown wood. Vern. *Mal.* Malan thumba.

6. Uncaria, Schreb.

Climbing shrubs with usually angular branchlets and sometimes having some of the axillary peduncles changed into strong recurved hooks. *Leaves* petioled; stipules interpetiolar, entire or bifid. *Flowers* in terminal or axillary, peduncled, solitary or panicled, globose heads; bracts in pairs on the peduncle, bracteoles small or 0. *Calyx*-tube fusiform; limb 5-lobed or -partite. *Corolla*-tube long, funnel-shaped; lobes 5, valvate or imbricate. *Stamens* 5, on the throat of the corolla; filaments short; anthers oblong with 2 basal bristles. *Ovary* 2-celled; ovules many, imbricate, on projecting placentas; style slender; stigma capitate or clavate. *Fruit* a head of capsules, each capsule elongate, septicidally 2-valved, many-seeded. *Seeds* imbricating upwards, very small; testa with long wings above and below; albumen fleshy; embryo clavate.

UNCARIA SESSILIFRUCTUS, Roxb.; F. B. I. iii. 30.

N. Circars, hills of Vizagapatam, at 5,000 ft. (A. W. Lushington).

A large climber with thin, elliptic, acute leaves up to 4·5 in. long and prominent curved axillary hooks.

7 Wendlandia, Bartl.

Small trees or shrubs. *Leaves* opposite or ternately whorled; stipules entire or 2-fid. *Flowers* small, white pinkish or yellowish, in dense terminal thyrsoid or panicled cymes; bracteoles 2–3, sometimes more, on the pedicels. *Calyx*-tube subglobose; lobes 4–5, small, persistent. *Corolla* tubular-salver- or funnel-shaped, globose or hairy within; lobes 4–5, imbricate in bud. *Stamens* 4–5, between the corolla-lobes; anthers versatile, exserted. *Ovary* 2-rarely 3-celled; ovules numerous on small globose placentas adnate to the septum; style filiform; stigma 2-fid. *Fruit* a small

globose loculicidal capsule, 2-valved. *Seeds* very small; testa membranous, reticulate; albumen fleshy; embryo short.

Corolla-tube short, equal to the lobes; stamens prominently exserted; calyx-tube villous; leaves lanceolate, grey-pubescent beneath as are the branchlets; stipules ovate-acute recurved.....1. *exserta.*

Corolla-tube elongate, slender, longer than the lobes; stamens sessile or with short filaments:—

Calyx-tube glabrous:—

Leaves usually opposite; bracteoles subulate, short:—

Branchlets glabrous; leaves elliptic-lanceolate, petioles nearly 1 in. long; stipules short, truncate or abruptly cuspidate; corolla-tube ·25 in. long, glabrous within.....2. *glabrata.*

Branchlets pubescent; leaves obovate-acuminate, sometimes ternate, petioles about ·5 in. long; stipules ovate-oblong, bifid at apex; corolla-tube ·15 in. long, villous within...3. *bicuspidata.*

Leaves ternately whorled, linear-lanceolate, petioles short; stipules triangular-ovate, 1–2-cuspidate; corolla-tube ·2 in. long, nearly glabrous within; bracteoles long; branchlets glabrous 4. *angustifolia.*

Calyx tube pubescent:—

Leaves usually opposite, rarely whorled, elliptic-lanceolate, acuminate, petioles ·25 to ·5 in. long, under surface slightly pubescent as are branchlets; stipules ovate, keeled, cuspidate; corolla-tube ·15 in. long, villous within; calyx-lobes short, ovate 5. *tinctoria.*

Leaves usually ternately whorled:—

Leaves elliptic-lanceolate, more or less densely brown-pubescent as are the branchlets and inflorescence; stipules ovate, obtuse, sometimes bifid, often recurved; corolla-tube ·2 in. long, slightly villous within; calyx-lobes and bracteoles short...6. *Notoniana.*

Leaves narrowly lanceolate, nearly glabrous, the branchlets and inflorescence softly pubescent; stipules triangular; corolla-tube 15 in. long, villous within; calyx-lobes and bracteoles long, linear .....7. *Lawii.*

1. WENDLANDIA EXSERTA, DC.; F. B. I. iii. 37; W. & A. 402.
N. Circars, Sál forests of Ganjam, not common.
A small often deciduous tree with ashy-grey foliage and fragrant white flowers. Bark brown; wood reddish-brown, hard, close-grained. Vern. *Hind.* Chaulai; *Ur.* Tilai; *Mar.* Til.

2. WENDLANDIA GLABRATA, DC.; F. B. I. iii. 39. *W. Heyneana*, Wall.; W. & A. 403.

N. Circars, hills of Ganjam Vizagapatam and Godavari, up to 4,500 ft.

A small tree, glabrous, with rather large white flowers and distantly and not prominently nerved leaves.

3. WENDLANDIA BICUSPIDATA, W. & A. 403. *W. Notoniana* var. *bicuspidata*, Hook. f.; F. B. I. iii. 40.

W. Ghâts, hills of Travancore.

A small tree.

4. WENDLANDIA ANGUSTIFOLIA, Wight; F. B. I. iii. 40.

Deccan, forests of Cuddâpah (Beddome); W. Ghâts, hills of Tinnevelly, at Courtallum (Wight) and Kannikatti (Rangachari).

A small tree with narrow whorled leaves and compact flower panicles.

5. WENDLANDIA TINCTORIA, DC.; F. B. I. iii. 38.

N. Circars, hills of Ganjam; Deccan, from the Nallamalai forests of Kurnool to the Naggur hills in N. Arcot, not common.

A small tree with pubescent panicles and strongly nerved leaves.

6. WENDLANDIA NOTONIANA, Wall; F. B. I. iii. 40; W. & A. 403; Wt. Ic. t. 1033, Spic. Neilgh. t. 95; Bedd. Fl. t. 224.

Deccan, hills of Cuddapah Bellary and Coimbatore, above 3,000 ft.; W. Ghâts, hills of S. Canara to the Nilgiris Pulneys and hills of Travancore, above 5,000 ft., Shevaroy hills.

A shrub or small tree, with leaves in whorls, the flowers pale yellow and fragrant. Bark orange red, fibrous; wood reddish brown, moderately hard. Vern. *Tam.* Kadamban; *Mal.* Puvu.

7. WENDLANDIA LAWII, Hook. f.; F. B. I. iii. 40.

W. Ghâts, Bababudan hills of Mysore (Law).

A small tree with flowers in large white-pubescent open panicles, the many slender bracteoles conspicuous.

8. Hymenodictyon, Wall.

Trees or shrubs with thick branches and bitter bark. *Leaves* petioled, deciduous; stipules interpetiolar, deciduous. *Flowers* small, in racemes or spikes in axillary or terminal panicles, with 1–2 large leafy reticulate persistent bracts; bracteoles linear

small or 0, deciduous. *Calyx*-tube short; lobes 5 or 6, small, deciduous. *Corolla*-tube slender, expanding in a campanulate 5-lobed limb; lobes valvate. *Stamens* 5, on the corolla limb; filaments short; anthers lanceolate, sagittate. *Ovary* 2-celled; ovules numerous, on placentas adnate to the septum; style long, slender; stigma capitate. *Fruit* a loculicidally 2-valved capsule, the placentas at length free. *Seeds* many, imbricating upwards; testa reticulate with reticulate wings bifid below; albumen fleshy; cotyledons ovate; radicle cylindric.

Flowers pedicelled, in fascicles or umbellules on a thyrsoid panicle; corolla-tube elongate; leaves broadly-ovate, acuminate, pubescent on both sides; capsules pendulous; seeds broadly-winged, ·5 in long
1. *excelsum*

Flowers sessile, in elongate spikes; corolla-tube short; leaves elliptic or obovate, abruptly acuminate, glabrous or only little pubescent beneath; capsules erect; seeds narrowly-winged, ·25 in. long.
2. *obovatum*

1. HYMENODICTYON EXCELSUM, Wall.; F. B. I. iii. 35; W. & A. 392. *H. obovatum*, Wt. Ic. t. 80, *not of* Wall.

N. Circars and Deccan, in deciduous forest; W. Ghâts, in deciduous forests in Malabar and Travancore up to 1,500 ft.

A large deciduous tree with pale green flowers, large soft leaves and conspicuous reticulate bracts, the capsule-valves persisting when leafless. Bark grey, soft; wood white when cut fresh, otherwise brownish-grey, not much used. Vern. *Hind.* Bhaulan; *Ur.* Bodoka; *Tel.* Dudippa; *Tam.* Vellei kadambu; *Mal.* Itthilei.

2. HYMENODICTYON OBOVATUM, Wall.; F. B. I. iii. 36; & A. 392; Wt. Ic. t. 1159; Bedd. Fl. t. 219.

W. Ghâts, from S. Canara and Mysore to Travancore, in deciduous forests up to 4,000 ft.

A small or medium-sized tree with obovate, long-petioled leaves and white flowers, the capsules erect. Wood brownish-grey, soft. Vern. *Mar.* Kadwa-sirid.

Various species of *Cinchona* obtained from seed imported from S. America, are grown in Government and private plantations in the Nilgiri Hills in order to supply India with quinine The chief species grown are *C. officinalis*, Hook., *C. Calisaya*, Wedd. and its var. *Ledgeriana*, and *C. succirubra*, Pavon.

9. Dentella, Forst.

A small prostrate herb. *Leaves* small; stipules connate, scarious. *Flowers* white, minute, solitary, axillary and in the forks of the dichotomous branches, sessile or pedicelled. *Calyx*-tube globose; limb tubular, 5-lobed, persistent. *Corolla* funnel-shaped, hairy within; lobes 5, 2-3-toothed. *Stamens* 5, in the middle of the corolla-tube; filaments short; anthers linear. *Ovary* 2-celled; ovules many, on hemispheric placentas; style short; stigmas filiform. *Fruit* small, dry, globose, indehiscent, 2-celled. *Seeds* many, minute, angular; testa puncticulate.

DENTELLA REPENS, Forst.; F. B. I. iii. 42; W. & A. 405.

All plains Districts, in moist places, especially rice-fields.

A slender prostrate rooting herb with dichotomous branches.

10. Argostemma, Wall.

Small delicate herbs. *Leaves* usually membranous, in pairs or false whorls, the pairs often unequal; stipules interpetiolar, entire or wanting. *Flowers* white, in peduncled cymes or umbels. *Calyx*-tube short; lobes usually 5. *Corolla* rotate, 4–5-partite, valvate. *Stamens* 4–5, inserted on the corolla-tube; filaments short; anthers long, curved, at first connivent, dehiscing by terminal pores. *Ovary* 2-celled; ovules very many, on swollen placentas on the middle of the septum; style filiform; stigma capitellate. *Fruit* a 2-celled capsule, dehiscing at the apex or by an operculum. *Seeds* minute, angled or compressed; testa granulate or reticulate; embryo minute.

Flowers 4-merous, peduncles longer than the leaves; leaves broadly orbicular-ovate, obtuse or slightly acute .....1. *Courtallense.*
Flowers 5-merous, peduncles much shorter than the leaves; leaves lanceolate or ovate-lanceolate, acuminate .....2. *verticillatum.*

1. ARGOSTEMMA COURTALLENSE, Arn; F. B. I. iii. 42; Wt. Ic. t. 1160.

   W. Ghâts, up to 3,000 ft. on rocks in shady places.

   A small herb about 3–6 in. high, with broad leaves often up to 2·5 in. in diam.

2. ARGOSTEMMA VERTICILLATUM, Wall.; Pl. As. Rar. t. 185; F. B. I. iii. 43.

   W. Ghâts, in the Anamalai Hills (Beddome).

A small delicate herb with narrow leaves up to 1·5 in. long, ·5 in. broad.

11. Neurocalyx, Hook.

Low herbs with rather short stems. *Leaves* membranous, entire or toothed, reticulate, crowded at the ends of the stems; stipules large, usually bifid. *Flowers* rather large, pale purple, in short axillary pendulous racemes; bracts simple or divided. *Calyx*-tube globose; lobes 5, broad, membranous, reticulate. *Corolla* rotate without tube; lobes 5, valvate, narrower than the calyx-lobes. *Stamens* 5; filaments very short; anthers connate in a conical tube, dehiscing inwards. *Ovary* 2-celled; ovules many, on peltate placentas; style filiform; stigma capitellate. *Fruit* coriaceous or fleshy, bursting irregularly. *Seeds* many, globose; testa muriculate; embryo small.

NEUROCALYX WIGHTII, Arn; F. B. I. iii. 47. *N. Hookeriana*, Wt. Ic. t. 52.

W. Ghâts, from S. Canara southwards, in moist places in evergreen forests at about 3,000 ft.

An almost woody-stemmed herb with crowded oblanceolate leaves 6–9 in. long, the flowers pale purple.

12. Oldenlandia, Plum.

Shrubs undershrubs or herbs, usually dichotomously branched. *Leaves* opposite, rarely ternately whorled; stipules interpetiolar, free or connate with the petioles, often pectinately or pinnatifidly fringed. *Flowers* white or pink, sometimes blue, in axillary or terminal, often paniculate, cymes, rarely solitary. *Calyx*-teeth 4, rarely 5, persistent. *Corolla* rotate campanulate or funnel-shaped; lobes 4, rarely 5, valvate. *Stamens* 4 or 5, in the throat of the corolla-tube, included or exserted. *Ovary* 2-celled; ovules numerous, on placentas attached to the septum; style filiform; stigmas 2, linear. *Fruit* a capsule, membranous or chartaceous, dehiscing septicidally, the cells splitting ventrally, or loculicidally in the upper part, or sometimes indehiscent. *Seeds* usually many, in cavities on the rounded placentas, smooth or angular; testa usually reticulate or pitted; albumen fleshy.

Capsule indehiscent or late dehiscent or the crown only dehiscing loculicidally :—

Flowers in sessile or subsessile axillary cymes :—

Capsule indehiscent, hard, globose; leaves ovate to lanceolate, variable in length, prominently nerved; stipules short, membranous, hispid, with few erect teeth; flowers pedicellate
1. *Auricularia.*

Capsule dehiscent at the top only :—

Capsule hard, crustaceous, ovoid; leaves lanceolate or ovate-lanceolate, rigid, midrib prominent, nerves indistinct; stipules with many long hair-like bristles; flowers sessile.....2. *nitida.*

Capsule soft, thin-walled; leaves small, ovate or orbicular, membranous, trinerved from the base; stipules very small with few slender processes; flowers shortly pedicelled
3. *trinervia.*

Flowers sessile, axillary or in terminal few-flowered heads; capsule crustaceous, globose, late dehiscent; leaves linear-subulate, aristate; stipules truncate with about 5–6 pectinate bristles
4. *caerulea.*

Capsule dehiscent septicidally, the 2 cocci dehiscing ventrally :—

Erect shrubs or undershrubs :—

Cymes in terminal panicles :—

Stipules triangular-ovate, the margins glandular, at any rate when young :—

Stipules glabrous, very glandular; calyx-lobes acute, short, recurved, villous; capsule ovoid; leaves lanceolate acuminate up to 4 in. long, the main nerves 6–12 pairs, very oblique .....5. *fruticosa.*

Stipules pubescent with few narrow pectinate teeth or glabrous and glandular; calyx-lobes less obtuse, glabrous, yellow, erect; capsule subcylindrical; leaves ovate or ovate-lanceolate, up to 3 in. long, main nerves usually 3–6 pairs, not very oblique .....6. *purpurascens.*

Stipules rounded, the margins simply pectinate, not usually glandular :—

Stipule-teeth elongate, subulate; foliage yellowish :—

Leaves coriaceous, sessile, narrowly lanceolate, the margins recurved, about 1 in. long, with closely-set thick nerves; capsule obovoid, glabrous; stipules nearly glabrous; flower-panicles large with long peduncles.....7. *articularis.*

Leaves thin, petioled, ovate-lanceolate, margins not recurved, up to 3 in. long with few slender nerves; capsule subglobose, grey-pubescent; stipules pubescent; flower-panicles shortly peduncled.....8. *pruinosa.*

Stipule-teeth short, subulate; stiff shrub with small very coriaceous leaves scarcely 5 in. long, the margins recurved, nerves very obscure; capsule short, obovoid; cymes short, few-flowered.....9. *buxifolia*.

Stipules ovate, sharply toothed, strigosely villous; stiff shrubs with coriaceous elliptic-ovate leaves up to 1·5 in. long, the margins recurved, nerves strong; flowers in short capitate cymes, very hispid.....10. *Beddomei*.

Stipules elongate, the margins pinnatisect:—

Stipules pubescent:—

Stipule-teeth few, about 5–7, long, distant; leaves ovate- or elliptic-lanceolate, acuminate, coriaceous, up to 4 in. long, margins recurved, usually glabrous; capsule ovoid, glabrous; calyx glabrous .....11. *stylosa*.

Stipule-teeth many, about 9–11, short, except the end ones, close; leaves lanceolate, acuminate, membranous, about 1·5 in. long, with about 3 pairs main nerves, hirsute; calyx pubescent.....12. *Bourdillonii*.

Stipules usually glabrous, glandular, with few filiform teeth:—

Leaves sessile, thick, glabrous, ovate, acute, yellow when dry, up to 3 in. long, main nerves 3–4 pairs, stipules all glabrous; flowers in large yellowish pubescent panicles of cymes; capsule globose, pubescent.....13. *swertioides*.

Leaves petioled, thin, glabrous, up to 7 in. long, main nerves about 8 pairs, stipules pubescent at first, then glabrous; flowers in nearly glabrous spreading panicles of cymes; capsule small, depressed-globose, glabrous 14. *eualata*.

Stipules, at any rate the lower ones, combined in a tubular scarious sheath, many-toothed on the margin:—

All stipules sheathing, large, ·5 in. or even more long, the teeth subulate; leaves elliptic-ovate or lanceolate, acuminate, prominently nerved and plicate, up to 3 in. long (perhaps more, as in Ceylon specimens); cymes in large panicles, the flowers large, in umbellules, scarcely pedicelled, ebracteolate, the bracts ovate; calyx-limb campanulate, ·15 in. long 15. *Lessertiana*.

Lower stipules sheathing, ·1–·5 in. long, upper triangular dentate, the teeth few, subulate; leaves lanceolate acuminate, prominently nerved, up to 3 in. long, the nerves impressed above; cymes in small corymbose panicles, the flowers small,

not umbellulate, with slender pedicels and linear bracteoles, the bracts lanceolate; calyx-limb campanulate, ·05 in. long
16. *anamalayana.*

Cymes axillary :—

Cymes pedunculate :—

Shrub with branches corrugated with stipular scars; stipules doubly pectinate, large, woolly; leaves elliptic-lanceolate, acuminate, hirsute, 1–3 in. long, ·5–1 in. broad, crowded at the ends of the branchlets; cymes little longer than leaves
17. *hirsutissima.*

Undershrubs with very pale leaves nearly or quite glabrous and whitish beneath :—

Stipules pinnatifid, ·4 in. long, villous; leaves lanceolate, acuminate, up to 3 in. long, 1 in. broad, main nerves about 4–6 pairs, oblique; cymes stout, 3–4 in. long
18. *sisaparensis.*

Stipules triangular, pectinately many-fringed, villous; leaves lanceolate, acuminate, up to 2 in. long by ·5 in. broad, main nerves obscure, about 4 pairs; cymes slender, about 2 in. long, the calyx glabrous.....19. *wynaadensis.*

Stipules ovate, pectinately fringed with black- gland-tipped teeth, glabrous; leaves lanceolate, acuminate, up to 3 in. long by 1 in. broad; main nerves about 6 pairs cymes short, crowded, nearly sessile, the calyx glabrous
20. *albonervia.*

Cymes sessile, the flowers fascicled :—

Stipules ovate, pectinate, with many softly villous long teeth; pedicels slender, the calyx-tube glabrous, lobes lanceolate; corolla-tube funnel-shaped; stamens exsert with long filaments; leaves elliptic or ovate up to 2 in. long, 1 in. broad, with about 5 pairs main nerves, yellow when dry
21. *villosostipulata.*

Stipules triangular, pectinate, with about 7 curved teeth, villous only at tip; pedicels slender, the calyx-tube hirsute, lobes linear; corolla-tube slender; stamens nearly sessile; leaves elliptic or lanceolate, up to 4 in. long, 1·5 in. broad, with about 7–9 pairs main nerves .....22. *Ramaraviii.*

Stipules triangular-ovate, pectinate, with linear glandular teeth; pedicels 0, the calyx-tube short, glabrous, the lobes oblong; corolla-tube cylindric; stamens nearly sessile; leaves oblong-lanceolate, up to 5 in. long, 1·25 in. broad, with about 6 pairs of inconspicuous main nerves 23. *membranacea.*

Stipules orbicular, glandular on the margins and on a ring at the middle inside, when old white and scarious; leaves ovate, sessile, very coriaceous and with much thickened margins, the nerves obscure, up to 1 in. long, ·5 in. broad; cymes sessile in the axils of upper leaves, 3-flowered, with minute linear bracteoles; calyx-lobes lanceolate, curved
24. Barberi.

Cymes capitate, in xillary bracteate whorled scapes; short-stemmed marsh herbs with many large, close, erect leaves in a rosette; scapes about as long as the leaves, the calyx glabrous with long linear lobes.....*25. verticillaris.*

Flowers solitary, axillary, on slender pedicels; stipules rounded, pectinate, scurfy, thickened below; leaves small, 1–1·5 in. long, elliptic, acuminate, the main nerves obscure, about 4 pairs
26. travancorica.

Flowers in axillary and terminal loose corymbs; leaves ovate to linear-lanceolate, long-acuminate, long-petioled, membranous, up to 5 in. long; stipules triangular, gland-toothed and viscid; capsule globose, glabrous.....*27. viscida.*

Climbing almost shrubby herb; crown of capsule opening loculicidally at top; flowers in lateral or terminal cymes of umbels; leaves sessile, lanceolate, long-acuminate, faintly few-nerved, glabrous, up to 5 in. long, 1 in. broad; stipules connate in a bicuspidate cup .....*28. scandens.*

Capsule dehiscent loculicidally in the upper part, sometimes nearly to the base:—

Capsule terete; seeds minute, angular, testa reticulate:—

Corolla-tube usually short:—

Peduncles axillary, 1-4-flowered:—

Leaves linear, narrow; bases of calyx-teeth not touching in fruit:—

Capsule valves short; corolla-tube short and broad; diffuse herbs:—

Flowers pedicelled, usually in pairs or threes
29. corymbosa.

Flowers sessile or nearly so, solitary.....*30. diffusa.*

Capsule valves elongate; corolla-tube slender; erect herbs
31. herbacea.

Leaves elliptic or elliptic-lanceolate; bases of calyx-teeth touching in fruit; peduncles 1–2-flowered; diffuse herb
32. crystallina.

Peduncles from upper axils, umbellate, many-flowered:—

Calyx-teeth short, subulate; capsule rounded; leaves narrow, rough ..... 33. *umbellata*.

Calyx-teeth long, lanceolate; capsule depressed; leaves rather broad, very scabrid ..... 34. *Wightii*.

Peduncles partly axillary, partly in terminal panicled cymes; pedicels filiform :—

Stem sharply angled; leaves linear, stiff; flowers very small, calyx-lobes minute ..... 35. *pusilla*.

Stem terete or nearly so; flowers rather large, corolla up to ·25 in long :—

Corolla campanulate, white or pale blue, with narrow tube, stamens included; calyx-lobes small; leaves linear-lanceolate, membranous, pale ..... 36. *dichotoma*.

Corolla campanulate, blue, with broad tube, stamens exserted, calyx-lobes large with a bristle in the sinus; leaves linear-subulate, stiff ..... 37. *Stocksii*.

Peduncles 1-flowered, terminal and axillary; corolla-tube slender, ·2–·3 in. long; stamens exserted; calyx-lobes small, lanceolate; leaves ovate or ovate-lanceolate, very small 38. *Prainiana*.

Corolla-tube slender, cylindric or funnel-shaped; erect herbs with narrow leaves and terminal cymes :—

Corolla-tube long and slender; anthers included :—

Leaves in fascicled whorls; calyx and short and broad capsules scabrous ..... 39. *aspera*.

Leaves not fascicled; calyx and elongate capsules glabrous 40. *gracilis*.

Corolla-tube rather short, slender; anthers exserted; leaves linear-lanceolate, the margins recurved :—

Flowers in long slender branching subracemose cymes; leaves glabrous ..... 41. *stricta*.

Flowers in short close cymes; leaves scabrid 42. *Shuteri*.

Capsule 4-angled or-winged; seeds hardly angled, testa pitted :—

Branching herbs with leaves throughout, the leaves elliptic, narrowed at the base :—

Capsule 4-angled; flowers in racemose panicles; calyx-lobes short, triangular ..... 43. *biflora*.

Capsule 4-winged; flowers in subcapitate cymes; calyx-lobes broad and much produced ..... 44. *alata*.

Erect small herbs with single stem 1–2 in. long, followed by a whorl of rather large membranous leaves, from which come the

slender long-peduncled cymes; fruit hemispheric, obscurely 4-sided ..... 45. *nudicaulis.*

1. OLDENLANDIA AURICULARIA, K. Schum. *Hedyotis Auricularia*, Linn.; F. B. I. iii. 58; W. & A. 412; Bedd. Ic. t. 27.
   Circars, Deccan and Carnatic, in hilly country; W. Ghâts and W. Coast from S. Canara southwards at low levels.
   An annual, usually trailing, herb, in open places the leaves ovate and short, in shady ones lanceolate and up to 3 in. long; flowers white.
2. OLDENLANDIA NITIDA, Gamble n. comb. *Hedyotis nitida*, W. & A. 412; F. B. I. iii. 61. *H. glabella*, Bedd. Ic. t. 36.
   Hills of the N. Circars; W. Ghâts, at low levels from S. Canara southwards.
   An annual usually prostrate herb with stiff leaves.
3. OLDENLANDIA TRINERVIA, Retz; F. B. I. iii. 60. *Hedyotis trinervia*, W. & A. 414; Bedd. Ic. t. 29.
   E. and W. Coast, in damp places, from Madras and S. Canara southwards.
   A small annual prostrate herb.
4. OLDENLANDIA CÆRULEA, Gamble n. comb. *Hedyotis caerulea*, W. & A. 412; Bedd. Ic. t. 30.
   E. Coast, Rambha in Ganjam, Nellore to Tanjore, on coast sands; W. Coast, in S. Canara.
   An annual, stiff, erect, scabrous herb, the flowers blue.
5. OLDENLANDIA FRUTICOSA, K. Schum. *Hedyotis fruticosa*, Linn.; F. B. I. iii. 49; W. & A. 408.
   W. Ghâts, hills of Travancore, at low levels up to 3,000 ft.
   An erect shrub.
6. OLDENLANDIA PURPURASCENS, O. Kze. *Hedyotis purpurascens*, Hook. f.; F. B. I. iii. 50. *H. purpurea*, Bedd. Ic. t. 5.
   W. Ghâts, hills of Travancore and Tinnevelly.
   A large erect shrub with beautiful and conspicuous purple flowers.

Var. *pallida*, Gamble, paler in colour with shorter ovate acuminate leaves and glabrous glandular stipules.

Sivagiri hills of Tinnevelly (Wight).

7. OLDENLANDIA ARTICULARIS, Gamble n. comb. *Hedyotis articularis*, Br.; F. B. I. iii. 51; W. & A. 407; Wt. Ic. t. 1028.
   W. Ghâts, Sholas of the Nilgiris above 6,000 ft., less common in Anamalais, Pulneys and Palghât Hills.

A stiff shrub with coriaceous yellowish leaves and lilac flowers; the stipules are rather variable, generally rounded, but sometimes triangular elongate, but the plant is easily recognised.

8. OLDENLANDIA PRUINOSA, O. Kze. *Hedyotis pruinosa*, W. & A. 408; F. B. I. iii. 51. *H. lentiginosa*, Bedd. Ic. t. 6.

W. Coast, in Malabar and Travancore, along backwaters.

A shrub with yellowish-pubescent thin leaves and spreading flower panicles.

9. OLDENLANDIA BUXIFOLIA, O. Kze. *Hedyotis buxifolia*, Bedd. Ic. t. 1; F. B. I. iii. 52.

W. Ghâts, higher ranges of the Anamalais, above 7,000 ft.

A stiff shrub with small, very coriaceous leaves.

10. OLDENLANDIA BEDDOMEI, O. Kze. *Hedyotis Beddomei*, Hook. f. in F. B. I. iii. 52. *H. capitata*, Bedd. Ic. t. 191.

W. Ghâts, Palghat hills of Malabar, in open grassy places at 6,500 ft.

A stiff shrub with white-barked nodose stems, the leaves yellow when dry.

11. OLDENLANDIA STYLOSA, O. Kze. *Hedyotis stylosa*, Br.; F. B. I. iii. 51; W. & A. 407; Wt. Ic. t. 1027, Spic. Neilgh. t. 93.

W. Ghâts, margins of Sholas and on open downs in the Nilgiris Pulneys and hills of Mysore above 5,000 ft., common.

A large shrub with blue-purple or lilac-tinged white flowers.

12. OLDENLANDIA BOURDILLONII, Gamble in Kew Bull. 1919 404.

W. Ghâts, hills of Travancore, in scrub at 2,000–4,000 ft.

A small shrub reaching 4 ft. in height.

13. OLDENLANDIA SWERTIOIDES, O. Kze. *Hedyotis swertioides*, Hook. f.; F. B. I. iii. 51.

W. Ghâts, on the downs of the Pulney Hills, at high levels, south to Travancore Hills.

A low shrub with lilac or white flowers—"Ground Lilac (Fyson)."

14. OLDENLANDIA EUALATA, Gamble in Kew Bull. 1919, 404 *Hedyotis eualata*, Bedd. M.S. in Herb. Kew.

W. Ghâts, Anamalais and hills of Tinnevelly at 4,000–

5,000 ft. (Beddome); Pykara Falls in Nilgiris at 5,000 ft. (Lawson).

A weak shrub with small flowers in many-bracteolate panicles, the leaves large.

15. OLDENLANDIA LESSERTIANA, O. Kze. *Hedyotis Lessertiana*, Arn.; F B. I. iii. 52; Trimen Fl. Ceyl. t. 49.

W. Ghâts, Anamalai Hills (Beddome).

A stout erect shrub with white flowers and conspicuous scarious tubular stipules, the leaves thick and plicate.

16. OLDENLANDIA ANAMALAYANA, Gamble in Kew Bull. 1920, 67. *Hedyotis Lessertiana*, Bedd. Ic. t. 31, *not of* Arn.

W. Ghâts, Anamalai Hills (Beddome) in higher ranges.

A slender erect undershrub with apparently white flowers.

17. OLDENLANDIA HIRSUTISSIMA, O. Kze. *Hedyotis hirsutissima*, Bedd. Ic. t. 2; F. B. I. iii. 55.

W. Ghâts, in W. Nilgiris at about 7,000 ft.

A shrub with stout stems and pale lilac flowers.

18. OLDENLANDIA SISAPARENSIS, Gamble n. comb. *Hedyotis sisaparensis*, Gage in Journ. As. Soc. Beng. 1905, 244.

W. Ghâts, in W. Nilgiris above Sispara at 7,000 ft.

An undershrub with quadrangular branches and pale leaves.

19. OLDENLANDIA WYNAADENSIS, Gamble in Kew Bull. 1919, 405.

W. Ghâts, Chambra peak forests, Wynaad, 4,500–6,000 ft. (Beddome).

A very large shrub (Beddome) with pale leaves, slightly bluish.

20. OLDENLANDIA ALBO-NERVIA, Gamble n. comb. *Hedyotis albo-nervia*, Bedd. Ic. t. 3; F. B. I. iii. 55.

W. Ghâts, hills of Tinnevelly and Travancore at 3,000–4,000 ft.

A glabrous pale undershrub.

21. OLDENLANDIA VILLOSOSTIPULATA, Gamble in Kew Bull. 1919, 405.

W. Ghâts, hills of Travancore.

A bush reaching 4 ft. in height.

22. OLDENLANDIA RAMAROWII, Gamble in Kew Bull. 1919, 405.

W. Ghâts, at Ponmudi, hills of Travancore (M. Rama Row); at Chimunji, 4,000 ft. (Bourdillon).

An undershrub with rather thick soft stems and parallel-nerved leaves.

23. OLDENLANDIA MEMBRANACEA, O. Kze. *Hedyotis membranacea*, Thw.; F. B. I. iii. 54.

W. Ghâts, at Kunjyar in Travancore.

A slender pale undershrub with obtusely 4-angled stems and flowers in sessile axillary whorls.

24. OLDENLANDIA BARBERI, Gamble in Kew Bull. 1920, 68.

W. Ghâts, Agastiamalai in Tinnevelly District, about 5,000 ft. (Barber).

An erect shrub with woody ringed branches, small leathery leaves closely packed at their top and prominent white stipules.

25. OLDENLANDIA VERTICILLARIS, O. Kze. *Hedyotis verticillaris*, W. & A. 409; F. B. I. iii. 56; Wt. Ic. t. 1029, Spic. Neilgh. t. 94.

W. Ghâts, Nilgiris, on the banks of the Pykara River at 6,000–7,000 ft.

A remarkable species with a large rosette of long parallel-ribbed leaves mixed with verticillate flower scapes; flowers lilac. It is often stemless, flat on the ground, but sometimes the stem elongates, covered densely with dry stipules.

26. OLDENLANDIA TRAVANCORICA, O. Kze. *Hedyotis travancorica*, Bedd. Ic. t. 7; F. B. I. iii. 55.

W. Ghâts, hills of Travancore and Tinnevelly at 3,000–4,000 ft.

A small undershrub with solitary flowers and white branchlets.

27. OLDENLANDIA VISCIDA, O. Kze. *Hedyotis viscida*, Bedd. Ic. t. 4; F. B. I. iii. 57.

W. Ghâts, hills of Tinnevelly, in the beds of mountain streams at 3,000 ft. (Beddome, Barber).

A large handsome shrub with slender branches.

28. OLDENLANDIA SCANDENS, K. Schum. *Hedyotis scandens*, F. B. I. iii. 57.

Travancore, without locality (Calder and Ramaswami).

A North-Indian plant with thin leaves.

29. OLDENLANDIA CORYMBOSA, Linn.; F. B. I. iii. 64. *Hedyotis Burmanniana*, Br.; W. & A. 415.

In all Districts, both on dry and wet lands; a common weed.

A variable annual herb, sometimes erect, sometimes, especially in wet places, prostrate and rooting; flowers white.

30. OLDENLANDIA DIFFUSA, Roxb.; F. B. I. iii. 65.
Most Districts, chiefly near the coast.
A prostrate annual herb, often rooting at the nodes.

31. OLDENLANDIA HERBACEA, Roxb. *O. Heynii*, Hook. f.; F. B. I. iii. 65. *Hedyotis Heynii*, W. & A. 416.
In most Districts, both in the plains and in hilly country.
An erect bushy annual or biennial herb; flowers white.

32. OLDENLANDIA CRYSTALLINA, Roxb.; F. B. I. iii. 65. *Hedyotis pumila*, Linn. f.; W. & A. 414.
E. Coast, Madras to Negapatam; W. Coast, in Travancore, scarce.
A prostrate annual herb.

33. OLDENLANDIA UMBELLATA, Linn.; F. B. I. iii. 66; Roxb. Cor. Pl. t. 3. *Hedyotis umbellata*, Lamk.; W. & A. 413.
Circars, Deccan and Carnatic, in dry places, especially on coast sands; "Chay-root."
A stiff biennial or perennial herb with lilac flowers, of considerable value, the bark of the root giving a valuable red dye. It is often cultivated. Vern. *Tel.* Cherivelu; *Tam.* Saya.

34. OLDENLANDIA WIGHTII, Hook. f.; F. B. I. iii. 66.
Deccan, on dry red soil lands
A stiff herb much resembling the last, perhaps not really distinct.

35. OLDENLANDIA PUSILLA, Rottl. *O. brachiata*, Hook. f.; F. B. I. iii. 66. *Hedyotis brachiata*, Wt.; W. & A. 415.
Carnatic, in Trichinopoly (Wight).
A stiff, erect, bushy herb.

36. OLDENLANDIA DICHOTOMA, Koen; F. B. I. iii. 67. *Hedyotis dichotoma*, W. & A. 416 *in part*.
N. Circars and Deccan, in hilly country up to 4,500 ft., usually on rocks.
A slender, pretty, erect herb with long hair-like pedicels.

37. OLDENLANDIA STOCKSII, Hook. f. & Th.; F. B. I. iii. 67.
Deccan, in the Bababudan hills of Mysore at 6,000 ft. (Stocks, Talbot).
A slender, much tufted annual with blue flowers, growing apparently among grass, 4–8 in. high.

38. OLDENLANDIA PRAINIANA, Craib in Kew Bull. 1910, 278. *Anotis Prainiana*, Talb. in Journ. Bomb. Nat. Hist. Soc. xi, 237, t. 6.

Deccan, in the Bababudan hills of Mysore (Talbot, Meebold), in dry rocks or fissures.

A small, moss-like, diffuse branching herb rooting at the nodes, with white or pinkish-white flowers and rather large pitted seeds.

39. OLDENLANDIA ASPERA, DC.; F. B. I. iii. 68. *Hedyotis aspera*, W. & A. 417.

Deccan, on dry stony lands in Cuddapah, Anantapur, Bellary and Coimbatore.

A stout annual herb with white flowers.

40. OLDENLANDIA GRACILIS, DC.; F. B. I. iii. 68. *Hedyotis aspera*, Bedd. Ic. t. 32.

Carnatic, in Tinnevelly and S. Travancore; Deccan, in Coimbatore hills at 4,000 ft.

A slender erect herb.

41. OLDENLANDIA STRICTA, Linn.; F. B. I. iii. 68. *Hedyotis maritima*, W. & A. 417.

E. Coast, on sandy seashore lands from Nellore southwards.

A tall, wiry annual herb.

42. OLDENLANDIA SHUTERI, Hook. f. in F. B. I. iii. 69.

E. Coast, near Madras (Shuter).

An annual erect scabrous herb.

43. OLDENLANDIA BIFLORA, Linn.; F. B. I. iii. 70. *O. paniculata*, Burm. f.; F. B. I. iii. 69, *not of* Linn. *Hedyotis biflora*, W. & A. 413. *H. racemosa*, Lam.; W. & A. 414; Wt. Ic. t. 312.

Plains Districts of the E. Coast, common: less so on W. Coast.

A diffuse annual glabrous almost succulent weed with white flowers.

44. OLDENLANDIA ALATA, Koen.; W. & A. 413; F. B. I. iii. 70.

N. Circars and Carnatic (Campbell, Wight) in the plains westward to Coimbatore; W. Coast, in Travancore.

A stout annual weed.

45. OLDENLANDIA NUDICAULIS, Roth; F. B. I. iii. 70. *Hedyotis nudicaulis*, W. & A. 416; Bedd. Ic. t. 34.

N. Circars, in Ganjam Sál forests (Gamble); W. Ghâts in

the Anamalais up to 2,500 ft., Wynaad, Pulneys, and Travancore hills.

An annual herb much resembling *Mollugo nudicaulis*, found in forest undergrowth.

13. Anotis, DC.

Herbs, prostrate or ascending, rarely erect, often with flaccid hairs. *Leaves* opposite; stipules interpetiolar, usually pectinate, and sometimes glandular. *Flowers* small, in axillary and terminal cymes or heads. *Calyx*-tube short; lobes 4, erect or recurved, with usually broad sinuses. *Corolla* tubular or funnel-shaped; lobes 4, valvate. *Stamens* 4, on the mouth of the corolla; anthers included or exserted. *Ovary* 2- rarely 3- 4-celled; style filiform; stigmas linear; ovules usually few on placentas arising from near the base of the septum. *Fruit* a 2- rarely 3- or 4-celled capsule, rarely indehiscent, usually loculicidal, rarely septicidal; cells 1- or more- but usually few-seeded. *Seeds* peltate, boat-shaped or plano-convex; testa pitted; embryo clavate in horny albumen.

Capsule dehiscing loculicidally; seeds excavated on one face:—

Flowers in cymes:—

Cymes dense-flowered, usually strigosely villous as are the leaves:—

Leaves lanceolate; corolla-tube broad, ·4–·5 in. long; erect herbs ..... 1. *longiflora*.

Leaves ovate; corolla-tube narrow, under ·25 in. long; straggling diffuse herbs rooting at the nodes ..... 2. *Leschenaultiana*.

Cymes loose-flowered, glabrous or sparingly hairy:—

Erect perennial herbs with terete stems; capsule not much exserted:—

Capsule subglobose, the cells 1–3-seeded; calyx-lobes triangular ..... 3. *decipiens*.

Capsule broader than long, the cells 2–4-seeded; calyx-lobes lanceolate ..... 4. *lancifolia*.

Erect annual herbs with quadrangular stems and filiform pedicels:—

Capsule much protruded, many-seeded, seeds cup-shaped; calyx-lobes minute; leaves minutely hairy ..... 5. *Rheedii*.

Capsule little protruded, many-seeded, seeds flat, reticulate; calyx-lobes small, lanceolate; leaves glabrous ..... 6. *calycina*.

Flowers in clusters:—

Capsule usually 3- or 4-celled; annual herbs with membra-

nous leaves and slender branches, the flowers usually 2–4 together ..... 7. *quadrilocularis.*

Capsule 2-celled :—

Leaves fleshy; calyx-lobes long and slender; capsule very little protruded ..... 8. *carnosa.*

Leaves membranous; capsules much protruded, broader than long :—

Leaves ovate or lanceolate, the branchlets hispid; capsule cells 1–3-seeded ..... 9. *Montholoni.*

Leaves linear, the branchlets glabrous; capsule cells 5-seeded ..... 10. *foetida.*

Capsule dehiscing septicidally, the cells 1–2-seeded; seeds excavated on one face; leaves membranous, ovate-lanceolate, long-petioled 11. *monosperma.*

Capsule indehiscent, compressed, the cells 1–2-seeded; seeds flat, not excavated; leaves small, ovate, sessile or subsessile ... 12. *Wightiana.*

1. ANOTIS LONGIFLORA, Hutch. in Kew Bull. 1916, 35.

W. Ghâts, Pulney Hills at 6,000–7,000 ft., margins of Shola forest.

An erect perennial with white (Bourne) flowers.

2. ANOTIS LESCHENAULTIANA, Benth. & Hook. f.; F. B. I. iii. 72. *Hedyotis Leschenaultiana*, W. & A. 411; Wt. Ill. t. 125.

W. Ghâts, common on the downs at 4,000–7,000 ft., usually in wet places.

A tufted perennial with pink or blue-purple flowers and unpleasant scent, the stems rooting at the nodes.

Var. *affinis*, Hook. f. *Hedyotis affinis*, W. & A. 411; Wt. Ic. t. 1030. A plant of smaller size with villous stems and smaller often purple corymbs; very bad smelling.

Nilgiri and Pulney Hills at high elevations, common.

Var. *deltoidea*, Hook. f.; *Hedyotis deltoidea*, W. & A. 410. A still smaller form, often nearly glabrous, the leaves sometimes lanceolate and the plant slender.

Nilgiri Hills (C. B. Clarke); Pulneys (Wight, etc.).

3. ANOTIS DECIPIENS, Hook. f.; F. B. I. iii. 72.

W. Ghâts, Pulneys and hills of Travancore and Tinnevelly.

A slender perennial, rooting at the lower nodes, the upper stems erect.

4. ANOTIS LANCIFOLIA, Hook. f.; F. B. I. iii. 73.

W. Ghâts, hills of Mysore.

5. ANOTIS RHEEDII, Benth. & Hook. f.; F. B. I. iii. 73.
   W. Coast and W. Ghâts, hills of S. Canara and Mysore to Cochin and Anamalais.
   A slender annual herb with filiform pedicels and quadrangular stems.
6. ANOTIS CALYCINA, Wall.; F. B. I. iii. 73.
   E. Ghâts, Mahendragiri Hill in Ganjam, 4,000 ft. (Fischer).
   A slender annual glabrous herb.
7. ANOTIS QUADRILOCULARIS, Benth. & Hook. f.; F. B. I. iii. 74. *Hedyotis quadrilocularis*, Thw.; Bedd. Ic. t. 28.
   W. Ghâts, Bababudan Hills of Mysore at 6,000 ft.; hills of Travancore and Tinnevelly, rare in Nilgiris, often in rock crevices.
   An erect annual, remarkable for its 3–4-celled capsule.
8. ANOTIS CARNOSA, Benth. & Hook. f.; F. B. I. iii. 74.
   W. Coast, on the sea shore in S. Canara (Hohenacker, Law).
   A fleshy diffuse annual.
9. ANOTIS MONTHOLONI, Hook. f.; F. B. I. iii. 73.
   W. Ghâts, from Mysore and Canara (Law) to Malaba. (de Montholon).
10. ANOTIS FOETIDA, Benth. & Hook. f.; F. B. I. iii. 74.
    W. Coast, on stony ground, S. Canara (Hohenacker).
    A slender wiry annual with linear leaves.
11. ANOTIS MONOSPERMA, Benth. & Hook. f.; F. B. I. iii. 75. *Hedyotis monosperma*, Wt. Ic. t. 1031.
    W. Ghâts, Nilgiris and Pulneys at about 7,000 ft., in shady places in Shola forests; Bababudan Hills of Mysore.
    A much-branched slender plant with small flowers.
12. ANOTIS WIGHTIANA, Benth. & Hook. f.; F. B. I. iii. 75.
    W. Ghâts, in the Nilgiris at 6,000–8,000 ft., in wet places.
    A small, close-growing, perennial, tufted, villous herb with white, blue or purplish flowers.

14. Ophiorrhiza, Linn.

Erect, creeping or decumbent small herbs, rarely undershrubs. *Leaves* opposite; stipules interpetiolar, caducous. *Flowers* white pink or greenish, secund on the branches of axillary or terminal dichotomous cymes; bracts and bracteoles various, sometimes

early caducous or 0. *Calyx*-tube short; lobes 5, small, persistent. *Corolla* tubular or funnel-shaped; lobes 5, valvate, often winged at the back, sometimes with a fold in the sinus. *Stamens* 5, inserted on the corolla-tube; filaments slender; anthers linear. *Disk* of 2 large lobes, erect in fruit. *Ovary* 2-celled; ovules many, on basal ascending placentas; style filiform; stigmas 2, linear or flattened. *Fruit* a compressed obcordate coriaceous capsule, girt by the calyx limb; the crown dehiscing by two broad gaping valves; placentas divaricate, many-seeded. *Seeds* minute, angled; testa crustaceous; albumen fleshy; embryo clavate.

Bracteoles none; cymes subumbellate, minutely rusty-puberulous, spreading and flat-topped, up to 3 in. diam. in fruit; leaves elliptic or elliptic-lanceolate, acuminate at apex, long-attenuate at base, 2–6 in. long, long-petioled; stipules of 2 slender teeth with small glands between; corolla short, under 5 in. long; capsule glabrous.

1. *Mungos.*

Bracteoles small and deciduous:—

Bracteoles very short:—

Small, procumbent, soft herbs, the leaves pale beneath, obtuse or slightly acute at apex, usually rounded at base, 1–3·5 in. long, 6–9-nerved; cymes small, under 1 in. in diam.; capsules glabrous or pubescent ..... 2. *Harrisiana.*

Small erect undershrub, the small leaves pale beneath, acute at apex, cuneate and decurrent at base, 7–8-nerved, 1–1·25 in. long; cymes small, few-flowered, ·5 in. in diam. ..... 3. *pykarensis.*

Erect undershrub with lanceolate, cordate-acuminate leaves 3·5–5·5 in. long; cymes lax and slender, 1–1·5 in. in diam.; capsule small, emarginate ..... 4. *Barberi.*

Bracteoles linear or filiform:—

Corolla-tube short, under ·25 in. long:—

Glabrous except the cymes and capsules, which are slightly tawny puberulous; leaves elliptic or elliptic-ovate, membranous, pale beneath, acuminate at apex, attenuate at base into the often long petiole; stipules often bifid; erect, slender undershrub with woody stem, the bracteoles subpersistent.

5. *Brunonis.*

Rusty-pubescent, especially the cymes and capsules; leaves ovate-lanceolate, pale beneath, acute or acuminate at apex, slightly attenuate at base into the often long petiole; stipules very villous; undershrubs usually rooting below and curving upwards ..... 6. *hirsutula.*

Corolla-tube over 1 in. long; cymes contracted; leaves membranous, elliptic-lanceolate, acuminate:—

Glabrous except the slightly pubescent corolla-tube; bracteoles filiform, often 1 in. long; stipules small, lanceolate, very caducous; leaf-nerves distant, about 6–8 pairs ...7. *grandiflora.*

Branchlets, leaf-nerves beneath, cymes and capsule pubescent; bracteoles linear, nearly glabrous, sometimes toothed; stipules ovate-oblong, large and broad, often bifid; leaf-nerves moderately close, about 8–10 pairs .....8. *Roxburghiana.*

Cymes conspicuously villous, including the filiform bracteoles and capsule, branchlets pubescent; stipules narrowly lanceolate, long, often bifid; leaf-nerves close, 10–16 pairs 9...*erianthа*

Bracteoles large and persistent, oblong- or linear-lanceolate, glabrous:—

Stipules narrowly acuminate from a broad base; cymes dense, the bracteoles oblong-lanceolate; leaves elliptic-lanceolate, long acuminate, sometimes narrow and linear-lanceolate, green beneath. 10. *pectinata.*

Stipules broadly ovate, acute; cymes loose, the bracteoles lanceolate-acuminate; leaves lanceolate, long-acuminate, glaucescent beneath.....11. *codyensis.*

1. OPHIORRHIZA MUNGOS, Linn.; F. B. I. iii. 77; W. & A. 404.
W. Ghâts, from Wynaad to the Anamalais and the hills of Travancore and Tinnevelly, at low levels, in evergreen forest.
A herbaceous undershrub with white flowers.

2. OPHIORRHIZA HARRISIANA, Heyne in W. & A. 405; F.B.I. iii. 78, var. 1 *only*. *O. Harrisonii*, Wt. Ic. t. 1162.
W. Ghâts, Bolampatti hills of Coimbatore, hills of Malabar, Tinnevelly and Travancore, in forest undergrowth, up to about 5,000 ft.
A low, soft, herbaceous plant with white or pinkish flowers, rooting from the lower nodes, the leaves usually obtuse, the capsules generally glabrous.

3. OPHIORRHIZA PYKARENSIS, Gamble in Kew Bull. 1919, 407.
Nilgiri Hills, at Pykara Falls, 6,000 ft. (Gamble).
An erect slender undershrub with small leaves and pale blue or lilac flowers.

4. OPHIORRHIZA BARBERI, Gamble in Kew Bull. 1919, 406.
W. Ghâts, in the Anamalai and Travancore Hills, about 3,000 ft. (Barber, Venkoba Rao).

An erect slender undershrub with lax glabrous cymes of pretty flowers.

5. **Ophiorrhiza Brunonis**, W. & A. 404; F. B. I. iii. 79. *Hedyotis Lawsoniae*, Wt. Ic. t. 1026 *probably*.

W. Ghâts, in the Nilgiri Hills above 5,000 ft., in Shola Forest undergrowth.

An erect, slender undershrub, variable, probably according to the amount of shade; flowers white or lilac.

Var. *Johnsoni*, Hook. f. Corolla-tube long and slender, ·5–·7 in. long, more villous.

Cochin, probably in the mountains (Johnson).

6. **Ophiorrhiza hirsutula**, Wight; F. B. I. iii. 81. *O. Brunonis*, W. & A. var. *hirsutior*, Hook. f.; F. B. I. iii. 80.

W. Ghâts, from S. Canara, Coorg and the Bababudan hills of Mysore to the Nilgiris and the hills of Travancore at 3,000–7,000 ft., in forest undergrowth; E. Ghâts, Aralagudem Ghât, Vizagapatam, 3,200 ft. (A. W. Lushington).

An undershrub, variable in size of leaf and length of petiole, also pubescence, probably according to the amount of shade. The S. Canara, Coorg and Mysore form is more slender and glabrous than the Nilgiri one, probably on account of a drier climate.

7. **Ophiorrhiza grandiflora**, Wt. Ic. t. 1069; F. B. I. iii. 80.

W. Ghâts, Sivagiri and Naterikal hills of Tinnevelly.

An erect undershrub with large flowers.

8. **Ophiorrhiza Roxburghiana**, Wt. Ic. t. 1068; F. B. I. iii. 81.

W. Ghâts, in the Pulney Hills (Wight), Periyar Shola (Bourne).

An erect undershrub with conspicuous flowers.

9. **Ophiorrhiza eriantha**, Wt. Ic. t. 1067; F. B. I. iii. 81.

W. Ghâts, at Courtallum in Tinnevelly (Wight); Travancore, at Peermerd (Beddome).

An erect undershrub, the large flowers very villous.

10. **Ophiorrhiza pectinata**, Arn.; F. B. I. iii. 81.

W. Ghâts, in Malabar, Anamalais, Tinnevelly and Travancore, at about 3,000 ft.

An erect undershrub, the leaves sometimes quite narrow.

11. **Ophiorrhiza codyensis**, Gamble in Kew Bull. 1919, 406.

Coorg, at Sampaji Ghât (Bourne).

An erect undershrub, the lower nodes sometimes rooting.

15. Mussaenda, Linn.

Shrubs or undershrubs, rarely herbs, erect or climbing. *Leaves* opposite or ternately whorled; stipules solitary or in pairs between the petioles. *Flowers* fairly large, in terminal cymes; bracts and bracteoles deciduous. *Calyx*-tube oblong or turbinate; lobes 5, usually deciduous, one lobe often transformed into a large petioled white or coloured leaf. *Corolla* tubular, funnel-shaped above, villous in the throat; lobes 5, valvate, usually apiculate. *Stamens* 5 on the throat of the corolla-tube or in the tube; filaments short; anthers linear. *Ovary* 2-celled; ovules numerous, on peltate fleshy placentas; style filiform; stigmas 2, linear. *Fruit* a fleshy berry, areolate on the top, many-seeded. *Seeds* minute; testa pitted; embryo minute, in fleshy albumen.

Calyx-lobes equal, not enlarged and leaf-like; branchlets and leaves beneath densely softly white-tomentose; stipules of 2 subulate teeth ·3 in. long from a broad short base; corolla-tube ·8–1 in. long, the limb 1 in. in diam.; berry ·25 in. diam, globose, strigosely hairy
1. *tomentosa.*

One calyx-lobe often much enlarged and leaf-like:—

Branchlets nearly glabrous except at nodes; leaves glabrous above, minutely villous only on nerves beneath, the nerves conspicuous, the transverse nervules parallel; stipules ·2 in. long, shortly bifurcated near the top; corolla-tube above 1 in. long, the limb ·5–·6 in. in diam.; berry obovoid, ·4–·5 in. long, glabrous.....2. *glabrata.*

Branchlets and leaves softly hairy:—

Inflorescence very lax; leaves loosely pubescent beneath, broadly ovate, abruptly acuminate at apex, the transverse nervules not prominently parallel; stipules about ·3 in. long, bifurcated about half-way down, the teeth curved outwards; corolla-tube above 1 in. long, the limb up to ·75 in. broad; berry obovoid, ·4–·5 in. long, sparsely hirsute .....3. *laxa.*

Inflorescence dense; leaves densely softly white-tomentose beneath, ovate, acuminate at apex, the transverse nervules obscure; stipules ·2–·25 in. long with two erect teeth on a broad base, not curved; corolla-tube about 1 in. long, the limb about ·5 in. in diam.; berry globose, ·4 in. in diam., sparsely hirsute
4. *frondosa.*

Branchlets and leaves roughly hirsute-pilose; inflorescence close, corolla-tube over 1 in. long, the limb ·7–·9 in. broad; stipules ·3–·4 in. long, bifurcated nearly to the base into slender spreading

teeth; leaves elliptic-ovate, acuminate, usually more or less rounded at base, strigosely villous; berry globose, ·5 in. in diam., sparingly hirsute ..... 5. *hirsutissima.*

1. MUSSAENDA TOMENTOSA, Wt.; F. B. I. iii. 88; W. & A. 394.
   Carnatic, Gingee Hills of S. Arcot, among rocks in shade (Wight); W. Ghâts, at Kannikatti, Tinnevelly, 2,500 ft. (Barber).
   Apparently a straggling shrub with white flowers turning yellowish.
2. MUSSAENDA GLABRATA, Hutch. in Herb. Kew. *M. frondosa* var. *glabrata*, Hook. f. in F. B. I. iii. 90. *M. frondosa* vars. γ, δ, W. & A. 394; W. Ill. t. 124.
   W. Ghâts, in S. Canara, Malabar and the Tinnevelly Hills.
   A climbing shrub, nearly glabrous, with orange flowers and very lax inflorescence, the long calyx-lobes conspicuous.
3. MUSSAENDA LAXA, Hutch. in Herb. Kew. *M. frondosa* var. *laxa*, Hook. f. in F. B. I. iii. 89.
   W. Coast and W. Ghâts, at low levels from S. Canara to Travancore, inland from Mysore to Tinnevelly up to 3,000 ft.
   A climbing shrub with lax inflorescence.
4. MUSSAENDA FRONDOSA, Linn.; F. B. I. iii. 89, vars. 1 *zeylanica* and 2 *ingrata*, Hook. f. *only*. *M. frondosa* var. α, W. & A. 393.
   S. Carnatic (probably, but no locality given, Wight), type in Ceylon.
   A straggling shrub with dense inflorescence and red flowers.
5. MUSSAENDA HIRSUTISSIMA, Hutch. in Herb. Kew. *M. frondosa* var. *hirsutissima*, Hook. f. in F. B. I. iii. 90 *in part*. *M. frondosa* var. β, W. & A. 394.
   W. Ghâts from Mysore through Nilgiris and Pulneys to Tinnevelly and Travancore at about 4,000–6,000 ft., common in Nilgiris.
   A large climbing shrub with conspicuous orange flowers and white calycine leaves. The flowers are frequently distorted by insect agency.

16. Acranthera, Arn.

Herbs or low undershrubs. *Leaves* large, membranous; stipules interpetiolar, triangular or ovate. *Flowers* blue, in sessile or

stoutly pedunculate subterminal cymes; bracts and bracteoles persistent. *Calyx*-tube oblong; lobes 5. *Corolla*-tube tubular-funnel-shaped, hairy without; lobes 5, valvate. *Stamens* 5, included in the tube; filaments filiform; anthers included, cohering at their apices, usually mucronate, the connective enlarged. *Ovary* 1-celled or apparently 2-celled, the parietal placentas meeting in the centre; ovules many; style filiform; stigma clavate, often verrucose. *Fruit* an oblong or fusiform berry, many-seeded. *Seeds* minute; testa crustaceous, pitted; embryo clavate, in dense albumen.

Leaves obovate, up to 10 in. long by 3 in broad, obtuse at apex, long-attenuate and almost decurrent on the petiole at base, conspicuously crispate-pubescent on the nerves and nervules beneath; corolla-tube 1·5 in. long, softly white-tomentose; calyx-lobes linear-lanceolate, erect ..... 1. *grandiflora.*
Leaves oblanceolate, up to 6 in. long by 1·5 in. broad, obtuse at apex, attenuate but not decurrent at base, tawny-pubescent on the nerves and nervules beneath; corolla-tube about ·75 in. long, tawny-villous; calyx-lobes short, obovate, spreading ..... 2. *anamallica.*

1. ACRANTHERA GRANDIFLORA, Bedd. Ic. t. 25; F. B. I. iii. 93.
W. Ghâts, hills of Tinnevelly and Travancore at 3,000–5,000 ft., in moist forests.
A pretty herbaceous plant with erect stem apparently about 6 in. long, the flowers pale blue.
2. ACRANTHERA ANAMALLICA, Bedd. Ic. t. 23; F. B. I. iii. 93.
W. Ghâts, in the Anamalai and Tinnevelly Hills at 4,000–5,000 ft., on stream banks in moist forests.
A low herbaceous plant with very short stem, the flowers deep blue.

17. Mycetia, Reinw.

Small shrubs, the stems with spongy bark. *Leaves* membranous, many-nerved; petioles often long; stipules large, interpetiolar. *Flowers* white yellow or greenish, in axillary and subterminal panicled diffuse cymes; bracts often glandular. *Calyx*-tube globose; lobes 4–6, persistent. *Petals* 4–6, connate in a tubular corolla; lobes valvate. *Stamens* 4–6, adnate to the corolla-tube, filaments short; anthers linear-oblong. *Ovary* 2- or 5–6-celled, ovules many, on fleshy peltate placentas; style cylindric; stigmas 2 or 5–6, linear. *Fruit* a globose fleshy or leathery berry, 2- or

5–6-celled, indehiscent or loculicidally dehiscent. *Seeds* very many, minute, angular; testa dotted; embryo minute, in fleshy albumen.

MYCETIA ACUMINATA, O. Kze. Rev. Gen. 289. *Adenosacme Lawii*, Hook. f.; F. B. I. iii. 96. *Lawia acuminata*, Wt. Ic. t. 1070.

W. Ghâts, in forest undergrowth, from Coorg (Bourne) through Nilgiris southwards, at about 3,000 ft.

A soft small shrub with large membranous leaves, yellow flowers and white berries.

18. Urophyllum, Wall.

Trees or shrubs. *Leaves* petioled, usually oblong-lanceolate and long-acuminate. *Flowers* small, in axillary, sessile or peduncled, heads cymes or corymbs; pedicels short, bracteolate. *Calyx*-tube short; limb cup-shaped, 5-lobed, persistent. *Corolla*-tube short, villous at the throat within; lobes 5, triangular, valvate. *Stamens* 5, on the throat of the corolla; filaments short; anthers oblong, the connective sometimes produced. *Disk* annular. *Ovary* 4–7-, usually 5-celled; ovules numerous, on axile placentas; style short; stigma entire or 4–7-lobed. *Fruit* a small many-seeded berry. *Seeds* minute, subglobose; testa crustaceous, pitted; embryo clavate, in fleshy albumen.

UROPHYLLUM ZEYLANICUM, Thw.; F. B. I. iii. 98. *Axanthes ceylanica*, Wt. Ic. t. 1163.

W. Ghâts, Anamalai Hills (Beddome).

A shrub with narrow, elliptic-lanceolate, acuminate leaves and orange-yellow berries.

19. Chomelia, Linn.

Trees or shrubs, the young parts often resinous. *Leaves* petioled; stipules interpetiolar, triangular-ovate. *Flowers* white, in terminal corymbose cymes, sessile or pedicelled; bracteoles 2 under the calyx, or if the flowers are pedicelled on the pedicel. *Calyx*-tube ovoid or turbinate; limb short with 5 lobes. *Corolla*-tube funnel-shaped or cylindric, lobes 5, twisted and overlapping to the left in bud, spreading in flower or reflexed. *Stamens* 5, adnate to the mouth of the corolla-tube; filaments short or 0; anthers narrow, linear, the connective produced in an apiculus.

Ovary 2-celled; ovules many in each cell; style stout, often pubescent; stigma fusiform, grooved, usually far-exserted. *Fruit* a small globose berry; cells 2, many-seeded. *Seeds* plano-convex; testa granular; albumen fleshy or horny; embryo small with leafy cotyledons.

CHOMELIA ASIATICA, O. Kze. *Webera corymbosa*, Willd.; F. B. I. iii. 102. *Stylocoryne Webera*, W. & A. 401; Wt. Ic. tt. 309, 584.

Dry forests in all plains Districts, common.

A large evergreen shrub with shining leaves, turning black (like most other species) in drying. The wood is light brown, hard and close-grained. Vern. *Tel.* Komi; *Tam.* Kura.

Var. *rigida*. *Stylocoryne rigida*, Wt. Ic. t. 1064, has smaller leaves with the nerves impressed above, and short calyx-lobes.

W. Ghâts, Shola forests of the Babadudan Hills, Nilgiris, Pulneys and Tinnevelly Hills at and over 5,000 ft.

Var. *montana*, Thw., has large leaves with impressed nerves, large flowers and conspicuous persistent calyx-lobes.

Shola forests of the Anamalai and Pulney Hills, above 5,500 ft.

20. Byrsophyllum, Hook. f.

Small trees or shrubs with stout branches, glabrous. *Leaves* very coriaceous; stipules large, interpetiolar, deciduous. *Flowers* large, dioecious, white or rose, ♂ in few-flowered terminal corymbs, ♀ solitary or in pairs, terminal; bracteoles small, linear-lanceolate. *Calyx*-tube in ♀ globose; limb in both ♂ and ♀ truncate. *Corolla* coriaceous, tube long, cylindric, the throat campanulate; lobes 4–6, twisted in bud. *Stamens* as many as the corolla-lobes, in the throat of the corolla; anthers sessile, included. *Ovary* 2-celled; ovules numerous, immersed in fleshy placentas adnate to the septum; style filiform; stigma fusiform, or 2 cohering. *Fruit* an ovoid or globose 2-celled berry. *Seeds* oblong, flattened.

BYRSOPHYLLUM TETRANDRUM, Hook. f.; F. B. I. iii. 107; Bedd. Fl. t. 326. *Gardenia tetrandra*, Bedd. Ic. t. 20.

Travancore and S. Tinnevelly mountains at 4,000–5,000 ft. (Beddome, Bourdillon).

A shrub or small tree with very coriaceous shining elliptic-obovate obtuse leaves, the flowers white tinged with rose, the

berry about ·75 in. in diam., the large stipules conspicuous before their fall.

21. Randia, Linn.

Trees or shrubs, armed or unarmed, the spines usually in opposite pairs, axillary to the branchlets. *Leaves* often with one of each pair arrested; stipules interpetiolar, short, free or connate. *Flowers* often dimorphic, white or yellowish, in axillary or leaf-opposed cymes, sometimes fascicled, rarely solitary. *Calyx*-tube ovoid or turbinate, the limb often tubular; lobes 5. *Corolla*-tube long or short, usually with a ring of hairs within; lobes 5, twisted to the left in bud, afterwards spreading. *Stamens* 5; anthers linear. *Disk* annular or pulvinate. *Ovary* 2-, rarely more-celled; ovules numerous, sunk in placentas attached to the septum; style slender; stigma fusiform, entire or bifid. *Fruit* a globose ovoid or ellipsoid berry, 2-celled, many-seeded. *Seeds* often embedded in pulp, smooth or angled; testa usually thin; albumen horny; cotyledons small.

Thorny plants:—

Berry with seeds embedded in pulp:—

Rind of the berry drying hard; the berry 1 in. in diam. or more:—

Spines short, sharp, in 1–2 pairs at the ends of arrested branchlets; leaves large, obovate or oblanceolate, obtuse or sometimes acute when young, up to 8 in. long by 4 in. broad; flowers solitary, dimorphic, in larger flowers up to 2 in. in diam.; fruit ovoid, smooth, up to 3 in. long; seeds smooth

1. *uliginosa.*

Spines axillary, opposite or alternate; flowers single or in fascicles of 1–3; corolla under 1 in. in diam.:—

Leaves obovate, under 1·5 in. long, ·75 in. broad; calyx-lobes about ·2 in. long, ovate with occasional intermediate appendages; fruit globose, smooth or slightly ribbed, about ·75 in. in diam.; seeds smooth.....2. *dumetorum.*

Leaves usually more than 1·5 in. long:—

Calyx-lobes ovate, often with subulate appendages like the tube, densely hairy, ·2 in. long; leaves elliptic or obovate with prominent regular hispidly villous nerves, which have tufts in their axils, up to 3 in. long, 1·5 in. broad; fruit ovoid-globose, ribbed, 1–1·5 in. in diam.; seeds smooth and usually minutely reticulate .....3. *Brandisii.*

Calyx-lobes lanceolate, not appendaged, recurved, sparsely hispid, 1·5–2 in. long; leaves obovate-spathulate with inconspicuous distant nerves, puberulous or glabrous, up to 5 in. long, 2 in. broad; fruit obovoid-globose, slightly ribbed, 1–1·5 in. in diam.; seeds smooth.... ..4. *longispina.*

Rind of the berry thin, leathery, the berry globose, up to ·5 in. in diam.; spines in axillary pairs; flowers in short cymes; calyx-teeth short, triangular, deciduous with the limb; leaves orbicular or obovate, attenuate at base, up to 4 in. long, 3 in. broad, the nerves prominent, glabrous or velvety; seeds smooth ..5. *Gaudichaudii.*

Berry small, hard, the few seeds not embedded in pulp; spines in axillary pairs; leaves obovate, 1–3 in. long, coriaceous, glabrous; flowers in umbel-like axillary corymbs with many bracteoles; seeds rough, with ruminate albumen..... ..6. *malabarica.*

Plants without thorns; flowers in leaf-opposed cymes:—

Erect tree; leaves lanceolate, acuminate, up to 6 in. long, 2 in. broad, glabrous; calyx-lobes short; corolla-tube longer than the lobes; berry globose, ·3–·4 in. in diam.....7. *Gardneri.*

Climbing shrub; leaves elliptic or ovate, shortly and obtusely acuminate, glabrous, up to 7 in. long by 3 in. broad; calyx-lobes very short; corolla-tube much shorter than the lobes; berry ovoid; seeds rather few, very rugose.....8. *rugulosa.*

1. RANDIA ULIGINOSA, DC.; F. B. I. iii. 110; W. & A. 398; Wt. Ic. t. 397. *Gardenia uliginosa*, Retz; Roxb. Cor. Pl. t. 135.

   All dry Districts in open forests, in wet places, savannah lands and on black cotton soil, in the hills up to 3,000 ft.

   A small deciduous tree with fragrant white flowers. Bark reddish-brown; wood greyish-white, hard and close-grained. Vern. *Hind.* Pindalu; *Ur.* Pendra; *Tel.* Nallaika; *Tam.* Wagatta; *Mal.* Karei.

2. RANDIA DUMETORUM, Lamk.; F. B. I. iii. 110 *in part*; W. & A. 397; Wt. Ic. t. 580. *Gardenia dumetorum*, Retz; Roxb. Cor. Pl. t. 136.

   East Coast Districts, in dry evergreen forests.

   A large shrub with opposite spines, white flowers turning yellow and a yellow fruit, used as a fish poison. Wood hard and close-grained. The branches are used for thorn-fences. Vern. *Tel.* Manga; *Tam.* Madu karei.

Var. *floribunda*. *R. floribunda*, DC.; W. & A. 398; Wt. Ic. t. 583.

East Coast, from the Kistna southwards, on coast sands chiefly.

A branching shrub with very small leaves, small fruit and many white flowers, the branches used for fencing.

3. RANDIA BRANDISII, Gamble n. comb. *R. tomentosa*, W. & A. 398, *not of* Blume.

Western Deccan and Carnatic from Mysore and Bellary to South Travancoré; W. Ghâts, dry slopes of Nilgiris and Pulneys up to 4,000 ft.

A large shrub or small tree with prominently nerved tomentose leaves, very hispidly villous calyx-tube and lobes and ribbed fruit.

4. RANDIA LONGISPINA, W. & A. 398; Wt. Ic. t. 582. *R. dumetorum*, Lamk.; F. B. I. iii. 112, *in part only*.

N. Circars, in the forests of Ganjam and Vizagapatam, up to 4,000 ft.

A small tree with large thin leaves, slender branches, and yellow apple-like fruit, used as fish poison. The spines are long in open places, small in trees under shade as in the Ganjam Sál forests. Bark grey; wood white or light brown, hard and even-grained. Vern. *Hind.* Mainphal; *Ur.* Potowa.

5. RANDIA CANDOLLEANA, W. & A. 399; F. B. I. iii. 113.

Deccan, Kambakam Hills of Chingleput, Naggur Hills of N. Arcot, Lambton's Peak in Coimbatore.

A small tree with thin glabrous leaves and crowded subterminal corymbs of white flowers.

Var. *corymbosa*. *R. corymbosa*, W. & A. 399. *R. deccanensis*, Bedd. Ic. t. 237.

Dry Districts of the Deccan in Kistna, Kurnool, Cuddapah and Anantapur, in open forest land.

A small tree with large stout thorns in pairs on poor soils, often unarmed, the leaves thicker, nearly orbicular and densely tawny-velvety. Bark thick, brown; wood light brown, hard and close-grained. Vern. *Tel.* Kondamanga.

6. RANDIA MALABARICA, Lamk.; F. B. I. iii. 111. *Gardenia fragrans*, Koen.; Roxb. Cor. Pl. t. 137. *Griffithia fragrans*, W. & A. 400; Wt. Ic. t. 310, *except fruit section*.

N. Circars, Deccan and Carnatic, extending to S. Travancore and to the E. slopes of the W. Ghâts, in dry evergreen scrub forests, common.

An erect thorny shrub with white scented flowers, red berry and orange seeds, largely cut to make hedges. Bark brown; wood greyish-white, hard and close-grained. Vern. *Tel.* Pedalli; *Tam.* Pudan.

7. RANDIA GARDNERI, Thw., F. B. I. iii. 112. *Griffithia Gardneri*, Bedd. Ic. t. 38.

W. Ghâts, evergreen forests of the Travancore Hills at 500–1,500 ft.

A medium-sized tree with white flowers. Bark greyish-brown; wood yellowish-brown, smooth and close-grained.

8. RANDIA RUGULOSA, Thw.; F. B. I. iii. 113. *Griffithia speciosa*, Bedd. Ic. t. 37.

W. Ghâts, from S. Canara and Coorg to the Nilgiris, Anamalais, Pulneys and the hills of Tinnevelly and Travancore, up to 4,000 ft.

A large climber with pendulous branches and white flowers, the leaf nerves usually impressed above.

Var. *speciosa*, Hook. f. Flowers larger, on longer pedicels; leaves acute at base, the nerves more raised than impressed.

W. Nilgiris, up to 4,500 ft., Anamalai and Pulney Hills and Sivagiri Hills of Tinnevelly.

22. Gardenia, Linn.

Trees or shrubs, armed or not. *Leaves* sometimes ternate; stipules intrapetiolar, often connate. *Flowers* usually white, changing to yellow, often large, terminal or axillary, solitary fascicled or cymose, sometimes dimorphic and polygamous. *Calyx*-tube ovoid or obconic; limb tubular, lobed or cleft or spathaceous. *Corolla*-tube long or short; lobes 5, rarely more, overlapping to the left in bud, then spreading, twisted. *Stamens* as many as the corolla-lobes, adnate to the tube; anthers sessile or subsessile, linear. *Ovary* 1-celled; ovules numerous, 2-seriate, on 2–6 parietal placentas; style thick; stigma club-shaped or fusiform, usually 2-fid. *Fruit* an often large, ovoid ellipsoid or globose, coriaceous or fleshy berry with a hard endocarp polished within, sometimes splitting along the placental sutures. *Seeds* very many, compressed; testa thin; albumen horny; cotyledons ovate or cordate.

Without spines:—

Fruit not or not prominently ribbed; leaves obtuse or subacute shining, the buds with a bright yellow resin:—

Calyx-teeth short, ovate or lanceolate, acute; leaves under 4 in long, obovate, sessile, nerves under 20 pairs, the transverse nervules irregular; fruit ellipsoid or oblong with 3–5 placentas, seed ·1 in. long, the testa rugose, radicle short..... 1. *gummifera.*

Calyx-teeth long, lanceolate, acuminate; leaf-nervules parallel; radicle long:—

Leaves elliptic, shortly petioled, 3–6 in. long, 2–3 in. broad; nerves 20–30 pairs; fruit ellipsoid or subglobose with 2 placentas; seed ·2 in. long, the testa rugose..... 2. *lucida.*

Leaves broadly elliptic or orbicular, attenuate at base to a short petiole, 6–12 in. long, 3–9 in. broad, nerves 12–18 pairs; fruit globose with 4–5 placentas; seeds nearly ·2 in. long, the testa rugose ..... 3. *latifolia.*

Fruit ribbed; leaves acute, obovate, 2–4 in. long, about 10-nerved; corolla usually double..... *jasminoides.*

Spines in pairs, strong, sometimes leaf-bearing; flowers dimorphic, the ♂ in fascicles, the ♀ solitary, the calyx-lobes minute in the former, longer in the latter; leaves obovate, glabrous or pubescent beneath, variable in size, nerves few, irregular; fruit large, woody, ovoid or globose, with 5–6 placentas, seeds small, testa smooth

4. turgida.

1. GARDENIA GUMMIFERA Linn. f.; F. B. I. iii. 116; W. & A. 395; Wt. Ic. t. 576.

N. Circars, Deccan and Carnatic, in deciduous forests, in dry hot localities, westwards to the foot of the Ghâts, on the Malabar Coast only in dry laterite forest.

A small tree or shrub with rough twisted branches, and a yellow resin which is used in medicine. Bark greyish-brown; wood yellowish-white, hard and close-grained. Vern. *Hind.* Dikemáli; *Ur.* Gurudu; *Tel.* Manchi bikki; *Kan.* Chitta bikke.

2. GARDENIA LUCIDA, Roxb.; F. B. I. iii. 115; W. & A. 395; Wt. Ic. t. 575.

Deccan and Carnatic, in deciduous forests in all the dry Districts.

A small tree or large shrub with pretty shining parallel-nerved leaves and a yellow resin used in medicine. Bark greenish-grey, flaking off; wood yellowish-white, hard and

close-grained, useful for small turned articles. Vern. *Hind.* Dikemáli: *Tel.* Yerri bikki; *Tam.* Kumbi.

3. GARDENIA LATIFOLIA, Ait.; F. B. I. iii. 116; Roxb. Cor. Pl. t. 134; W. & A. 395; Wt. Ic. t. 759. *G. cuneandra*, Koen.; F. B. I. iii. 119; W. & A. 395; Wt. Ic. t. 574.

N. Circars and Deccan, extending to the lower hills of the Ghâts, in dry deciduous forests.

A small deciduous tree with large leaves and flowers and a yellow resin. The form with 9 petals and stamens is common in the N. Circars. Bark greenish-grey, exfoliating and leaving rounded depressions; wood light yellowish-brown, close-grained, useful for turning, perhaps for engraving. Vern. *Hind.* Papra; *Ur.* Kota ranga, Jantia; *Tel.* Pedda bikki; *Tam.* Kumbay.

4. GARDENIA TURGIDA, Roxb.; F. B. I. iii. 118; Wt. Ic. t. 579. *G. montana*, Roxb.; W. & A. 396.

All dry deciduous forests, especially on rocky hills and on laterite and kunkur.

A small deciduous tree with very strong spines, variable leaves and a large woody fruit. Bark smooth, bluish-grey, thick; wood white, hard and close-grained. Vern. *Hind.* Thanella; *Ur.* Bamenia; *Tel.* Yerra bikki.

Gardenia jasminoides, Ellis, is the Cape Jasmine frequently cultivated in gardens, and usually having double white, very fragrant flowers.

23. Tricalysia, A. Rich.

Evergreen trees or shrubs, branchlets tetragonous or terete. *Leaves* petioled; stipules interpetiolar, triangular, acuminate, connate at base. *Flowers* small or very small, polygamo-dioecious, in axillary fascicles or short cymes; bracts and bracteoles connate. *Calyx*-tube short, obconic or hemispheric; limb truncate, 4–5-lobed. *Corolla*-tube short; lobes 4–5, twisted to the left in bud, various in size. *Stamens* as many as the corolla lobes; filaments long or short or even 0; anthers oblong or linear, often curved. *Ovary* 2-, rarely 3-celled; ovules 2–5 in each cell, on fleshy placentas attached to the septum; style short or long; stigmatic arms linear or oblong. *Fruit* a globose or ovoid berry, the pericarp thick, cells 2. *Seeds* few in each cell, compressed vertically; albumen thin, fleshy; cotyledons ovate, radicle long.

Flowers minute, fascicled; calyx-lobes oblong-orbicular; corolla-lobes orbicular; stamens sessile; berry globose, up to ·6 in. in diam., the seeds flat, smooth, much compressed, with membranous partitions between; leaves elliptic or lanceolate, obtusely acute, smooth, the main nerves about 6–8 pairs, not prominent, nor the reticulation ..... 1. *sphaerocarpa.*

Flowers in small cymes, the ♂ and ☿ about ·4 in. in diam., the ♀ smaller; calyx minutely toothed; corolla-lobes oblong; stamens in ♂ and ☿ with long filaments, exserted; berry ovoid or globose, up to ·7 in. in diam., the seeds irregularly compressed, rugose; leaves elliptic-lanceolate, acuminate, the main nerves about 5 pairs, prominent, as is the reticulation ..... 2. *apiocarpa.*

1. TRICALYSIA SPHAEROCARPA, Gamble n. comb. *Diplospora sphaerocarpa*, Hook. f.; F. B. I. iii. 123.

W. Ghâts: Courtallum in Tinnevelly (Wight).

A small tree, with smooth leaves and very small flowers.

2. TRICALYSIA APIOCARPA, Gamble n. comb. *Diplospora apiocarpa*, Hook. f.; F. B. I. iii. 123; Bedd. Fl. t. 223; *Discospermum apiocarpum*, Dalz.; Bedd. Ic. t. 40.

W. Ghâts, in the Coimbatore Hills, Nilgiris, Anamalais and hills of Travancore at 3,000–4,000 ft.

A small tree with prominently reticulate leaves, and cream-coloured scented flowers.

24. Scyphiphora, Gaertn.

A small glabrous tree, branchlets stout, swollen at the nodes. *Leaves* coriaceous, obovate, obtuse; stipules interpetiolar, short. *Flowers* small, in dense axillary shortly pedunculate cymes. *Calyx*-tube elongate; limb cupular, truncate, 4–5-toothed. *Corolla*-tube cylindric; lobes 4–5, oblong, spreading or recurved, twisted in bud. *Stamens* 4–5, between the corolla-lobes; anthers linear-sagittate. *Disk* annular. *Ovary* 2-celled; ovules 2 in each cell, on the middle of the septum; style filiform with linear branches. *Fruit* a subcylindric 8–10-grooved drupe with 2 crustaceous connate pyrenes. *Seeds* subcylindric; testa membranous; albumen scanty; cotyledons oblong.

SCYPHIPHORA HYDROPHYLLACEA, Gaertn.; F. B. I. iii. 125. *Epithynia malayana*, Jack; W. & A. 424.

E. Coast, in mangrove forests (Wight).

A small evergreen tree resembling *Lumnitzera* and often

found with it, but very scarce. and apparently only once collected.

25. Knoxia, Linn.

Erect herbs or undershrubs; stems terete or obscurely angled. *Leaves* opposite; stipules connate with the petiole in a sheath. *Flowers* dimorphic, from white to pink, lilac and even purple; subsessile on the elongating branches of terminal cymes; ebracteolate. *Calyx*-tube ovoid; teeth 4, minute and subequal or 1 or 2 elongate, persistent. *Corolla*-tube long, the throat usually villous; lobes 4, valvate with inflexed tips. *Stamens* 4, inserted within the throat of the corolla; anthers linear, included or exserted. *Ovary* 2-celled; ovule 1 in each cell, pendulous; style filiform; stigma 2-lobed, included or exserted. *Fruit* small, of 2 semi-terete indehiscent mericarps separating from an entire or bifid persistent columella. *Seeds* with membranous testa; albumen fleshy; cotyledons very small; radicle superior.

Calyx-lobes equal or nearly so, one slightly longer; flowers in corymbose cymes:—

Stipules with short blade furnished with 3 5- or -more long subulate bristles:—

Stipule-bristles hirsute; ripe fruit separating vertically from the columella, the mericarps remaining connate:—

Leaves lanceolate or linear-lanceolate, up to 6 in. long, 1 in. broad, grey pubescent; cymes lax with elongating slender branches ... . 1. *corymbosa.*

Leaves ovate, acuminate, up to 5 in. long, 1·5 in. broad, densely and usually rufous pubescent but sometimes almost white; cymes dense with short subumbellate branches.....2. *mollis.*

Stipule-bristles glabrous, often very long and conspicuous; ripe fruit separating from the base into two mericarps away from the columella; leaves lanceolate, long acuminate, up to 5 in. long, 1·5 in. broad, nearly glabrous ..... 3. *Heyneana.*

Stipules with rounded blade and few short glabrous teeth; mericarps separating from the base; leaves oblong-lanceolate or linear-lanceolate, often folded, curved downwards, glabrous; cymes small with slightly elongating branches; fruit subglobular 4. *Wightiana.*

Stipules ovate, long-acuminate, pectinate, hirsute; mericarps not separating from each other; leaves linear or linear-lanceolate, scabrous-pubescent, up to 2·5 in. long, ·1–·3 in. broad; cymes erect with slender racemose branches; fruit ovoid... ....5. *linearis.*

One calyx-lobe much enlarged; flowers in long slender spikes; leaves ovate or ovate-oblong, up to 2 in. long; stipules with 3–5 filiform bristles; mericarps separating ..... 6. *zeylanica.*

1. KNOXIA CORYMBOSA, Willd.; F. B. I. iii. 128; W. & A. 439; Wt. Ill. t. 128.

   All Forest Districts, chiefly on grass lands in woodland and up to about 6,000 ft. in the hills.

   An erect herb with pale lilac flowers, long narrow leaves and long stem-internodes, the whole plant very grey.

2. KNOXIA MOLLIS, W. & A. 439; F. B. I. iii. 129.

   W. Ghâts, in all Districts, especially the Nilgiris and Pulneys, above 5,000 ft., common.

   A straggling herb, sometimes woody at base, the flowers varying from white to purple, unpleasantly scented, the leaves variable in pubescence. Fyson is correct in distinguishing two forms, a smaller roadside one and a larger one in damp sholas.

3. KNOXIA HEYNEANA, DC.; F. B. I. iii. 129; W. & A. 440.

   W. Ghâts, in the hills of Tinnevelly and Travancore, about 4,000–5,000 ft.

   An erect herb nearly quite glabrous, from a woody root-stock.

4. KNOXIA WIGHTIANA, Wall.; F. B. I. iii. 129; W. & A. 440.

   Deccan, hills of Cuddapah, N. Arcot and Chingleput; W. Ghâts, from the Nilgiris southwards, up to about 5,000 ft.

   An erect herb, woody at base, the flowers pale blue, the leaves very narrow.

5. KNOXIA LINEARIS, Gamble in Kew Bull., 1920, 68.

   W. Ghâts, Mahendragiri Hill, Tinnevelly (K. Rangachari).

   An erect, slender, graceful, herbaceous perennial, with many stems from a woody rootstock.

6. KNOXIA ZEYLANICA, Linn.; F. B. I. iii. 130; W. & A. 440.

   Wynaad (Beddome).

   An erect undershrub with white or pinkish flowers in long slender spikes, the corolla-tube very long and slender.

26. Plectronia, Linn.

Trees or shrubs, erect or climbing, armed or unarmed. *Leaves* petioled; stipules connate. *Flowers* in axillary fascicles or

peduncled corymbose cymes, white or greenish, small. *Calyx*-tube short, obconic or turbinate; limb short, truncate or 4–5-lobed. *Corolla*-tube funnel-shaped campanulate or cylindric, usually with a ring of deflexed hairs within; lobes 4–5, valvate in bud, at length reflexed. *Stamens* 4–5, on the throat or mouth of the corolla; filaments short or 0. *Disk* rounded, cushion-like. *Ovary* 2-celled; ovules solitary in each cell, pendulous; style stout, sometimes with a tuft of hairs; stigma large. *Fruit* a didymous or subglobose drupe, one carpel sometimes suppressed; pyrenes 2, each 1-celled. *Seeds* oblong, pendulous; testa membranous; albumen fleshy, cotyledons short with an elongated superior radicle.

Unarmed:—

Flowers pentamerous:—

Flowers in axillary peduncled cymes or umbels, corolla-tube narrow; leaves shining on the upper surface; stipules ovate with a dorsal subulate hard point:—

Leaves coriaceous; pyrenes prominently rugose, the pericarp thin:—

Fruit small, ·25–·5 in. long, globose or obcordate, compressed; leaves ovate or ovate-lanceolate or narrowly oblong-lanceolate, acuminate ....1. *didyma.*

Fruit large, up to 1 in. or more long, pyriform, compressed; leaves elliptic, shortly acuminate.....2. *ficiformis.*

Leaves chartaceous, elliptic, caudate-acuminate; pyrenes rugose, the pericarp thick; fruit globose, ·75–1 in. in diam.

3. *pergracilis.*

Flowers in axillary umbels, the peduncle very short or 0, the corolla-tube broad; leaves dull, coriaceous or chartaceous, elliptic-obtuse or acute; stipules ovate-lanceolate; fruit obovoid, obcordate, compressed, ·25–·5 in. long, pyrenes smooth

4. *neilgherrensis.*

Flowers tetramerous, in fascicles of cymes axillary with the leaves on stout arrested branchlets, pedicels very slender; leaves membranous, ovate, acuminate, pale beneath, up to 2 in. long; stipule points filiform; fruit flattened, orbicular, ·4 in. in diam., pyrenes rugose ....5. *travancorica.*

Armed, the spines supra-axillary:—

Flowers pentamerous, in short few-flowered axillary fascicles or cymes, the corolla-tube short, broad, slightly constricted above, furnished with a curtain of stiff reflexed hairs within, lobes lanceo-

late; leaves from ovate-cordate to lanceolate-acuminate; fruit obcordate, compressed, about ·4 in. in diam.; pyrenes rugose ..... 6. *Rheedii.*

Flowers tetramerous, in many-flowered axillary cymes, very small, the corolla-tube short with short reflexed hairs within, lobes ovate; leaves variable, ovate obovate or orbicular, up to 2 in. long, 1·5 in. broad but often much smaller; fruit obcordate, ·5 in. in diam.; pyrenes furrowed ..... 7. *parviflora.*

1. PLECTRONIA DIDYMA, Kurz. *Canthium didymum*, Gaertn.; F. B. I. iii. 132; W.! & A. 425.

All plains Districts in dry evergreen and open forests in the low country on both sides of the Peninsula, often on river banks.

A small evergreen tree, the leaves variable in size and shape but always shining, flowers in cymes, fruit usually globose. Bark dark grey, smooth; wood light brown, hard and close-grained. Vern. *Ur.* Dhalasingha; *Tel.* Nalla balasu; *Tam.* Irambaratthán.

Var. *umbellata*, Gamble. *P. Wightii*, K. Schum. *Canthium umbellatum*, Wt. Ic. t. 1034, F. B. I. iii. 132. *C. didymum*, Bedd. Fl. t. 221.

Most Districts, in forest country in hilly regions up to 6,000 ft.

A larger evergreen tree with larger and thicker, broader leaves, flowers in umbels on thick peduncles, fruit larger and obovoid. Wood pale yellow, strong and tough (Bourdillon). Vern. *Tam.* Nallamanthanam; *Mar.* Arsul.

Var. *lanceolata*, Thw. *Canthium lanceolatum*, Arn.

Hills of Tinnevelly (Wight, Barber).

Leaves narrowly oblong-lanceolate acuminate, up to 5 in. long, 1·25 in. broad; flowers in fewer-flowered umbels, perhaps a distinct species.

2. PLECTRONIA FICIFORMIS, Gamble n. comb. *Canthium ficiforme*, Hook. f.; F. B. I. iii. 133.

W. Ghâts, Pulney Hills (Bourne) and Sivagiri Hills of Tinnevelly (Wight) at fairly high elevations.

An evergreen tree, like the preceding, but with elliptic leaves, umbels often compound and very large fruit.

3. PLECTRONIA PERGRACILIS, Gamble, n. comb. *Canthium pergracile*, Bourd. in Journ. Bomb. Nat. Hist. Soc. xii. 352, t. 4.

Evergreen forests of Travancore near Colatoorpolay at about 500 ft. (Bourdillon).

A graceful, tall, straight-stemmed tree with greenish-yellow flowers. Bark light brown, rough; wood pale brown, moderately hard. Vern. *Mal.* Palaga.

4. PLECTRONIA NEILGHERRENSIS, Bedd. *Canthium neilgherrense*, Wt. Ic. t. 1064 *bis*; F. B. I. iii. 133, var. 1; Bedd. Fl. t. 221 A (fruit).

W. Ghâts, Sholas of W. Nilgiris about Sispara; forests of the Travancore and Tinnevelly Hills at 4,000–6,000 ft.

An evergreen shrub or small tree with coriaceous glabrous leaves, obtusely acute or obtuse at apex, the margins often recurved.

Var. *chartacea*, Gamble. *Canthium neilgherrense*, Wt.; F. B. I. iii. 133, var. 2.

W. Ghâts, Coonoor and Longwood Sholas of E. Nilgiris; Sholas of the Pulney Hills at 5,000–7,000 ft.

A small tree with chartaceous acute leaves, hirsute beneath.

5. PLECTRONIA TRAVANCORICA, Bedd. Ic. t. 239. *Canthium travancoricum*, Hook f. in F. B. I. iii. 134.

W. Ghâts, in the Anamalais and hills of Travancore and Tinnevelly.

A medium-sized tree with thin, long-petioled leaves and white flowers.

6. PLECTRONIA RHEEDII, Bedd. *Canthium Rheedii*, DC.; F. B. I. iii. 134; W. & A. 426.

W. Coast and W. Ghâts from S. Canara southwards up to about 4,000 ft.

A scandent thorny straggling shrub with greenish-white flowers, the branchlets and leaves beneath usually hirsute.

Var. *angustifolia*, Gamble. *Canthium angustifolium*, Roxb.; F. B. I. iii. 135. *C. Leschenaultii*, W. & A. 426; Wt. Ic. t. 826.

W. Coast and W. Ghâts, especially in the south, up to 5,000 ft.

Leaves lanceolate, long-acuminate, glabrous and shining, occasionally very narrow.

7. PLECTRONIA PARVIFLORA, Bedd. *Canthium parviflorum*, Lamk.; F. B. I. iii. 136; Roxb. Cor. Pl. t. 51; W. & A. 426.

All dry plains Districts, in scrub forest, especially on laterite and near the coast, very common.

A thorny shrub with small white flowers, the leaves variable, small and with many thorns in very dry places, larger in moister ones. Bark, grey, wood grey, hard. The stems and branches are largely used for dry fences. Vern. *Tel.* Balasu; *Mar.* Kirna; *Tam.* Karay cheddi.

27. Vangueria, Juss.

Erect shrubs or small trees, armed or unarmed. *Leaves* petioled; stipules connate. *Flowers* small, white or greenish, in axillary fascicles or peduncled cymes or in lateral panicles below the leaves. *Calyx*-tube short, turbinate or globose; limb spreading; lobes 4–6, sometimes more. *Corolla*-tube cylindric or globose, with a ring of silky deflexed hairs within; lobes 4–6, lanceolate, acute, at length reflexed. *Stamens* as many as the corolla-lobes, filaments short or 0; anthers oblong. *Ovary* 3–6- but usually 5-celled; ovules solitary in each cell, pendulous; style thick; stigma large, capitate, ridged. *Fruit* a dry or fleshy drupe, with 3–5 pyrenes, the apex areolate. *Seeds* in each pyrene solitary; testa membranous; albumen fleshy; cotyledons small with an elongated superior radicle.

VANGUERIA SPINOSA, Roxb.; F. B. I. iii. 136; W. & A. 421 (in note).

Most plains Districts, but occasional and scarce.

A small thorny tree or large shrub, the fruit small.

V edulis, Vahl, a native of Madagascar, with rather large edible fruit, larger leaves and flowers in panicles of racemes, is sometimes found in gardens in Madras and elsewhere.

28. Octotropis, Bedd.

Glabrous shrubs or small trees, branches slender. *Leaves* shortly petioled, elliptic-lanceolate, caudate-acuminate, membranous; stipules interpetiolar, triangular-ovate, acuminate. *Flowers* in axillary or supra-axillary pedunculate corymbs, pedicels slender; bracts and bracteoles minute. *Calyx*-tube short, turbinate; limb 4-toothed. *Corolla*-tube campanulate, villous within; lobes 4, ovate, overlapping to left. *Stamens* 4, linear, apiculate, sagittate at base, sessile. *Ovary* 1-celled; ovules 1 or 2, pendulous; style stout, ribbed; stigma bifid. *Fruit* an ellipsoid berry with fleshy pericarp. *Seed* ovoid, pendulous; testa membranous; albumen horny; cotyledons small, foliaceous.

OCTOTROPIS TRAVANCORICA, Bedd. Fl. t. 327; F. B. I. iii, 131.
W. Ghâts, from the Wynaad to the hills of Travancore and Tinnevelly, at 3,000–5,000 ft., in moist evergreen forest.
A pretty shrub or small tree reaching 10–15 ft. in height, with white flowers and a single-seeded berry.

29. Ixora, Linn.

Shrubs or small trees. *Leaves* opposite, rarely ternate, usually thick; stipules interpetiolar. *Flowers* usually 4- (rarely 5-) merous, in terminal, trichotomously branched, often corymbose cymes; bracts usually leaf-like, coriaceous; bracteoles 2. *Calyx*-tube ovoid; limb short, 4-, rarely 5-lobed, the lobes persistent. *Corolla* hypocrateriform; tube long, slender; lobes 4 (rarely 5), twisted in bud, spreading or reflexed in flower. *Stamens* 4 (rarely 5) on the mouth of the corolla; filaments short or 0; anthers slender, 2-fid at base, mucronate at tip. *Ovary* 2-celled, ovules solitary in each cell, peltately attached to the septum; style filiform; stigma fusiform, slender, 2-branched, the branches rarely connate. *Fruit* globose or didymous with 2 plano-convex or ventrally concave coriaceous pyrenes. *Seeds* peltate, often 1 only, the others undeveloped, testa membranous; albumen horny; embryo curved, the cotyledons thin, the radicle stout and long, inferior.

Calyx-lobes manifestly longer than the tube:—
Calyx-lobes broad, oblong-lanceolate, ·15–·25 in. long; corymbs dense and compact:—
Branches of the inflorescence densely clothed with white hairs; corymbs about 5 in. broad, subsessile; bracteoles oblong-lanceolate, about ·2 in. long; corolla-tube slender, 1 in. long; leaves large, elliptic obovate or oblanceolate, up to 12 in. long, 5 in. broad, abruptly acuminate, the nerves distant ..... 1. *polyantha.*
Branches of the inflorescence glabrous; corymbs about 3 in. broad, short-peduncled; bracteoles linear; corolla-tube ·75–1 in. long; leaves obovate or oblanceolate, up to 4 in. long, 1·5 in. broad, obtuse ..... 2. *Finlaysoniana.*
Calyx-lobes lanceolate or linear-lanceolate, ·075–·15 in. long, the margins usually incurved:-
Calyx-lobes glabrous:-
Corymbs lax:—

Leaves lanceolate, broadest near the nearly obtuse base, up to 6 in. long, ·75–1·25 in. broad, the nerves stout, nearly at right angles to the midrib, prominently looped; corolla-tube up to ·75 in. long, lobes ·35 in. long; bracteoles linear, like the calyx-lobes .....3. *lanceolaria.*

Leaves elliptic-ovate or -oblong, broadest at the middle, acute or acuminate, up to 5 in. long, 2 in. broad, the nerves slender at about 60° with the midrib, looped; corolla-tube up to ·6 in. long, the lobes scarcely shorter; bracteoles subulate, narrower than the calyx-lobes.....4. *leucantha.*

Corymbs dense:—

Leaves coriaceous, elliptic-obovate, obtusely acute at apex, attenuate or rounded at base, shining above, the midrib and nerves strong, up to 8 in. long, 3 in. broad; corymbs long-peduncled, brachiate; corolla-tube ·3–·5 in. long, the lobes recurved in flower.....5. *Notoniana.*

Leaves submembranous, elliptic-obovate, acute and mucronate at apex, broadly attenuate at base, dull above, the nerves thin, impressed above, up to 8 in. long, 3·5 in. broad; corymbs sessile, dense; corolla-tube ·75 in. long, the lobes reflexed in flower.. ....6. *Johnsoni.*

Calyx-lobes hirsute; corymbs rather lax with short peduncles; leaves coriaceous elliptic or elliptic ovate, scabrous pubescent beneath, up to 6 in. long by 2·5 in. broad, the nerves prominent; corolla-tube ·5 in. long, the lobes reflexed in flower; bracteoles filiform .....7. *Saulierei.*

Calyx-lobes linear, ·15 in. long, ciliate, as are the linear bracteoles; corymbs shortly peduncled, densely congested; corolla-tube ·3–·5 in. long; leaves coriaceous, variable, from elliptic-ovate to oblong-lanceolate, usually rounded at base, somewhat shining above, up to 6 in. long by 2·5 in. broad.....8. *Lawsoni.*

Calyx-lobes about equal to the tube:—

Calyx-tube and lobes pubescent:—

Peduncles 4–7 in. long, the cymes brachiate, the corymbs densely congested; corolla-tube ·5 in. long, lobes reflexed, covered with spreading hairs; leaves large, chartaceous, elliptic-obovate or -oblanceolate with regular parallel nerves.....9. *elongata.*

Peduncles short or 0:—

Peduncles about ·5 in. long, the branches long and slender and again divided to end in spreading corymbs; corolla-tube ·5–1 in long, lobes glabrous; leaves large, lanceolate or oblanceolate, acuminate, up to 6 in. long, 2·5 in. broad.....10. *cuneifolia.*

Peduncles 0, the 3 branches slender, ·5 in. long, ending in small dense corymbs; corolla-tube about ·35 in. long, the lobes reflexed puberulous; leaves small, oblanceolate, acuminate, up to 3 in. long, 1 in. broad, pubescent beneath.....11. *monticola.*

Calyx-tube and lobes glabrous; leaves undulate on the margins:—

Corolla-tube 1–1·5 in. long, the cymes sessile, dense; leaves oblong-oblanceolate, shortly acuminate, mucronate, up to 5 in. long, 1·25 in. broad, the nerves sub-horizontal .....12. *Thwaitesii.*

Corolla-tube ·25–·35 in. long, the cymes peduncled, brachiate, lax; leaves elliptic or elliptic-lanceolate, acuminate, up to 6 in. or even more long, 2 in. broad.....13. *undulata.*

Calyx-lobes minute, manifestly much shorter than the tube:—

Calyx-lobes triangular, acute, glabrous:—

Leaves and inflorescence black when dry; flowers white, in sessile or peduncled brachiate cymes; corolla-tube ·5 in. long, very slender; leaves membranous, lanceolate or elliptic-oblong or -obovate, acuminate, narrowed at base, up to 6 in. long, 2·5 in. broad.....14. *nigricans.*

Leaves olive-green when dry; flowers scarlet, in dense sessile or shortly peduncled corymbiform cymes; corolla-tube 1–1·5 in. long; leaves oblong or elliptic, obtuse or shortly acute at apex, rounded or cordate at base, up to 4 in. long by 2·5 in. broad

15. *coccinea.*

Calyx-lobes reduced to mere teeth, sometimes almost 0:—

Flower-buds globose; cymes sessile or shortly peduncled, much brachiate; corolla-tube under ·25 in. long, lobes recurved, under ·1 in. long; leaves thinly coriaceous, elliptic-oblong or -lanceolate, narrowed at base, obtuse at apex, up to 8 in. long, 3 in. broad

16. *brachiata.*

Flower-buds ellipsoid; cymes sessile, brachiate, with 3–5 pairs short branches; corolla-tube ·3–·4 in. long, lobes recurved, ·1 in. long; leaves thickly coriaceous, elliptic or obovate, obtuse, rounded or cordate at base, up to 5 in. long, 2·25 in. broad

17. *parviflora.*

1. IXORA POLYANTHA, Wt. Ic. t. 1066; F. B. I. iii. 140. *I. corymbosa*, Heyne; W. & A. 430.

W. Coast, in S. Canara, Malabar and Travancore.

A large and handsome shrub with (apparently) white flowers and a yellowish-red fruit about ·4 in. in diam.

2. IXORA FINLAYSONIANA, Wall. *ex* G. Don Gen. Syst. iii. 572.

Mysore, at Bangalore (Cameron), said to be wild, but this

is doubtful; gardens in Madras and elsewhere in the East, native country doubtful.

A shrub with white flowers and large membranous calyx-lobes.

3. IXORA LANCEOLARIA, Colebr.; F. B. I. iii. 198; W. & A. 429, var. *a*; Wt. Ic. t. 827.

Hills of Tinnevelly and Travancore, in evergreen forests.

An erect shrub with narrow leaves, the white flowers in lax corymbs.

4. IXORA LEUCANTHA, Heyne. *I. lanceolaria*, Hook. f.; F B. I. iii. 138 *in part*; W. & A. var. *β*.

Hills of Tinnevelly and Travancore.

A pretty shrub with white flowers in lax, rather few-flowered corymbs.

Var. *malabarica*, Gamble. Leaves longer, more oblong, long-acuminate, corymbs often brachiate.

West Coast, South Canara to Travancore.

5. IXORA NOTONIANA, Wall.; F. B. I. iii. 139; W. & A. 1311.

W. Ghâts, in the hills of Mysore, Nilgiris, Anamalais, Pulneys and hills of Travancore, in Shola forests at 3,000–6,000 ft.

A small tree with red flowers. Bark brown, rough; wood reddish-brown, hard and close-grained. Vern. *Tam.* Kalilambili; *Mal.* Iramburippi.

6. IXORA JOHNSONI, Hook. f.; F. B. I. iii. 139.

W. Coast, Cochin (Johnson), Travancore (Calder and Ramaswami).

A small tree or large shrub, apparently scarce.

7. IXORA SAULIEREI, Gamble in Kew Bull. 1920, 247.

W. Ghâts, in the Pulney Hills.

Apparently a small tree with thick leaves, scabrous-pubescent beneath.

8. IXORA LAWSONI, Gamble in Kew Bull. 1920, 247.

Wynaad, at Manantoddy, 3,000 ft. (Lawson); Coorg (Wight).

A small tree with very congested villous inflorescence and linear calyx-lobes.

9. IXORA ELONGATA, Heyne; F. B. I. iii. 141; W. & A. 430.

W. Ghâts, from S. Canara to the Wynaad and Atapadi Hills of Malabar, at about 2,000 ft.

A shrub with pink flowers and long-peduncled inflorescence, the fruits large, black when dry.

10. IXORA CUNEIFOLIA, Roxb.; F. B. I. iii. 144; W. & A. 428; Wt. Ic. t. 709.

W. Ghâts, in Wynaad and the Atamalai and Anamalai Hills of Coimbatore, about 3,000 ft.

A shrub with pubescent calyx and white or pink (?) flowers.

11. IXORA MONTICOLA, Gamble in Kew Bull. 1920, 247.

W. Ghâts, "High Wavy Mountain," in Madura District, at 4,000–5,500 ft. (Blatter and Hallberg).

A shrub with pinkish flowers, remarkable for its small leaves and inflorescence.

12. IXORA THWAITESII, Hook. f.; F. B. I. iii. 138.

Forests of Malabar (Beddome).

A narrow-leaved shrub, the corolla-tube very long and slender.

13. IXORA UNDULATA, Roxb.; F. B. I. iii. 147; W. & A. 428; Wt. Ic. t. 708.

E. Ghâts, Madgol Hills of Vizagapatam, at 3,400 ft. (A. W. Lushington); Simhachellam Hill (Cleghorn).

A shrub with thin undulate leaves and rather small white flowers.

14. IXORA NIGRICANS, Br.; F. B. I. iii. 148; W. & A. 428; Wt. Ic. t. 318.

W. Ghâts, in evergreen forests, up to about 5,000 ft., common.

A large shrub or small tree with white flowers.

15. IXORA COCCINEA, Linn.; F. B. I. iii. 145; W. & A. 427; Wt. Ic. t. 153. *I. Bandhuca*, Roxb.; Wt. Ic. t. 149.

W. Coast, in forest lands at low elevations near the sea; cultivated in gardens everywhere.

A large shrub with brilliant scarlet flowers, sometimes yellow or pink. Vern. *Tam.* Thetti, Vedchi.

16. IXORA BRACHIATA. Roxb.; F. B. I. iii. 142; W. & A. 429; Wt. Ic. t. 710.

W. Ghâts, from S. Canara to Travancore, at low elevations.

A small tree with white, scented flowers.

17. IXORA PARVIFLORA, Vahl; F. B. I. iii. 142; W. & A. 429; Wt. Ic. t. 711; Bedd. Fl. t. 222.

Deciduous forests and dry evergreen forest in almost all Districts, under 1,000–2,000 ft. The Torch Tree.

A small evergreen tree or large shrub with white flowers. Bark dark brown; wood light reddish-brown, smooth, close-grained. The green branches are said to be used for torches. Vern. *Hind.* Kota gandhal; *Ur.* Kilakerwa; *Tel.* Kori, Gorivi; *Tam.* Shulundu, Korivi; *Kan.* Korgi; *Mar.* Lokandi.

30. Pavetta, Linn.

Shrubs or small trees. *Leaves* opposite, petioled, usually thin; stipules intrapetiolar, usually connate in a loose deciduous sheath. *Flowers* in terminal or axillary trichotomously-branched corymbose cymes; bracteoles small. *Calyx*-limb turbinate or campanulate; lobes 4 (rarely 5). *Corolla* hypocrateriform; tube slender, cylindric; lobes 4 (rarely 5), twisted in bud, spreading in flower. *Stamens* 4 (rarely 5), on the mouth of the corolla; filaments short or long, or 0; anthers linear. *Ovary* 2-celled; ovules solitary in each cell, attached to the septum on a fleshy placenta; style long, much exserted, slender; stigma fusiform, usually undivided. *Fruit* a small fleshy berry with 2 ventrally concave pyrenes. *Seeds* conform to the pyrenes; testa membranous; albumen horny; embryo small, curved, with small foliaceous cotyledons; radicle inferior.

Calyx-teeth minute; branchlets pale brown, thick, subquadrangular; leaves glabrous or tomentose, membranous, very variable in shape but usually elliptic or obovate or oblanceolate; corolla-tube ·5–75 in. long ..... 1. *indica.*

Calyx-teeth short :—

Calyx-teeth triangular; branchlets pale, slender; corolla-tube ·5–1 in. long, the lobes rounded at apex; styles very long with minute stigmas; corymbs lax :—

Black when dry; leaves lanceolate or oblanceolate, pubescent beneath, the nerves obscure; inflorescence, including calyx, grey-villous ..... 2. *hispidula.*

Greenish when dry; leaves oblong or oblanceolate, glabrous beneath, the nerves regular, prominent and prominently arched; inflorescence glabrous or slightly puberulous ..... 3. *zeylanica.*

Calyx-teeth subulate, recurved; branchlets very pale, stout; corolla-tube short, about ·25 in. long, the lobes acute at apex;

style short with fusiform stigma; leaves black when dry, elliptic-oblong or -oblanceolate, about 2·5 in. long; corymbs dense
4. *breviflora.*

Calyx-teeth rather long :—

Calyx-teeth lanceolate, white- or brown-hispid, recurved; corolla-tube ·25–·5 in. long, the lobes oblong; leaves obovate or oblanceolate, softly hirsute; corymbs dense, the pedicels short
5. *Brunonis.*

Calyx-teeth lanceolate, erect, glabrous; corolla-tube ·5 in. long or more, the lobes narrow; leaves elliptic-lanceolate, prominently glandular; corymbs lax, the pedicels long and slender. 6. *Wightii.*

1. PAVETTA INDICA, Linn.; F. B. I. iii. 150; W. & A. 431; Wt. Ic. t. 148.

All forest Districts, in the undergrowth of deciduous forests and usually in ravines, up to 3,000 ft. in the hills.

A small tree or large shrub with pretty white flowers and very variable leaves.

Var. *tomentosa*, Hook. f.; F. B. I. iii. 150. *P. tomentosa*, Roxb.; W. & A. 431. *P. Brunonis*, Wt. Ic. t. 1065. Leaves beneath and inflorescence softly tomentose, otherwise similar.

All forest Districts equally with the above.

Var. *montana*, Thw.; F. B. I. iii. 150. Leaves elliptic, obtuse or obtusely acute, corolla-tube short.

Kollimalai Hills, Trichinopoly (K. Rungachari).

Var. *minor*, Hook. f.; F. B. I. iii. 150. Leaves lanceolate or narrowly obovate, the inflorescence fewer-flowered.

Hills of Madura and Tinnevelly up to 3,000 ft.

2. PAVETTA HISPIDULA, W. & A. 431; F. B. I. iii. 151.

W. Ghâts, in evergreen forests from S. Canara southwards, up to about 3,000 ft.

A narrow-leaved shrub with yellowish long-tubed flowers and prominent long styles.

3. PAVETTA ZEYLANICA, Gamble. *Pavetta hispidula* var. *zeylanica*, Hook. f.: F. B. I. iii. 151.

W. Ghâts, in Wynaad, the Atapadi Hills of Malabar and hills of Tinnevelly, up to 3,000 ft., in evergreen forests.

A large shrub with oblong leaves and long-tubed flowers with prominent styles.

4. PAVETTA BREVIFLORA, DC.; F. B. I. iii. 151, Wt. Ic. t. 1035.

W. Ghâts, in the Nilgiri and Pulney Hills, in Shola forests above 5,000 ft., in undergrowth; Mahendragiri Hill in Ganjam, at 4,500 ft. ? (Gamble).

A pretty shrub with white flowers and thin leaves. Bark greyish-white; wood white, hard and close-grained. As noted by Wight, the calyx-lobes, usually glabrous, are sometimes ciliate.

Var. *subcoriacea*, Gamble. Leaves much thicker, also the calyx-lobes, and the tube of the corolla longer. Here, too, the calyx-lobes are sometimes ciliate.

Hills of Travancore and Tinnevelly, in evergreen forests above 4,000 ft.: Bababudan Hills of Mysore at 6,000 ft. (Meebold).

5. PAVETTA BRUNONIS, Wall; F. B. I. iii. 152.

W. Ghâts, N. and W. slopes of Nilgiris at 5,000–6,000 ft.

A softly-tomentose shrub.

6. PAVETTA WIGHTII, Hook. f.; F. B. I. iii. 152.

W Ghâts, E. side of Nilgiri Hills at about 4,000–6,000 ft.

A shrub with rather large obovate leaves, prominently glandular.

31. Stylocoryne, W. & A.

Trees or shrubs, unarmed. *Leaves* petioled, usually black when dry; stipules interpetiolar. *Flowers* white or greenish, in terminal cymose corymbs. *Calyx*-tube turbinate, 5-toothed. *Corolla*-tube cylindric, limb hypocrateriform with 5 imbricate lobes. *Stamens* 5, inserted on the mouth of the corolla-tube; anthers linear, exserted. *Ovary* 2-celled, ovules 1 or 2 in each cell, sunk in a fleshy axilely attached placenta; style slender, often hairy; stigma fusiform. *Fruit* a glabrous 2-celled berry, 1–2-seeded. *Seed* rounded, albumen fleshy, cotyledons small, foliaceous.

Ovules 2 in each cell; corolla-tube longer than the lobes; leaves oblanceolate, acuminate, thin, 4–9 in. long, 1–1·25 in. broad; berry white, ·3 in. in diam.; seed 1 ..... 1. *monosperma.*

Ovule 1 in each cell, seeds 2:—

Tube of corolla shorter than the lobes; leaves lanceolate or oblanceolate, obtusely acute, coriaceous, 2–4 in. long, ·5–1 in. broad; berry ovoid ..... 2. *lucens.*

Tube of corolla equal to or longer than the lobes, ·5–·8 in. long, thick; leaves oblanceolate, acuminate, 6–12 in. long, 2–3·5 in.

broad, the nerves distant, nearly black when dry; cymes and calyx-tube glabrous .....3. *canarica.*
Tube of corolla longer than the lobes, 1 in. long or more, slender; leaves oblanceolate, caudate-acuminate, 4–9 in. long, 1·5–2·5 in. broad, the nerves rather close, olive-green when dry; cymes and calyx-tube pubescent .....4. *nilagirica.*

1. STYLOCORYNE MONOSPERMA, W. & A. 401; Wt. Ic. t. 317. *Webera monosperma*, Hook. f.; F. B. I. iii. 103.
   W Ghâts, about Courtallum in Tinnevelly (Wight): Travancore Hills, at 2,000 ft. (Lawson).
   A shrub with large leaves and white fleshy berry.
2. STYLOCORYNE LUCENS, Gamble n. comb. *Webera lucens*, Hook. f.; F. B. I. iii. 106. *Coffea alpestris*, Wt. Ic. t. 1040, Spic. Neilgh. t. 100. *C. grumelioides*, Wt. Ic. t. 1041, Spic. Neilgh. t. 101.
   W. Ghats, Shola forests of the Kundahs in Nilgiris, above 7,000 ft.; hills of Tinnevelly and Travancore.
   A bushy shrub with shining leaves, the flowers white.
3. STYLOCORYNE CANARICA, Gamble n. comb. *Webera canarica*, Hook. f.; F. B. I. iii. 106.
   W. Ghâts, evergreen forests from S. Canara to Tinnevelly and Travancore, at moderate elevations.
   A handsome shrub with large flowers and leaves.
4. STYLOCORYNE NILAGIRICA, Gamble n. comb. *Webera nilagirica*, Hook. f.; F. B. I. iii. 107.
   W. Ghâts, in Sholas from W. Nilgiris to Travancore: Atapadi Hills of Malabar, at 3,000 ft.
   A shrub with long-tubed flowers.

32. Coffea, Linn.

Shrubs. *Leaves* opposite, rarely ternate; stipules broad, interpetiolar. *Flowers* in axillary fascicles or cymes or solitary; bracteoles connate in a single or double calyculus, often glandular within. *Calyx*-tube short; limb short, turbinate, often glandular within, lobes 4-5 or irregularly many-toothed. *Corolla*-tube short or long; lobes 4-5, twisted in bud, then spreading. *Stamens* 4-5; filaments short or 0; anthers linear, attached to the throat of the corolla-tube. *Ovary* 2-celled; ovules solitary in each cell, peltate on the septum; style slender, bifid at apex

the lobes linear. *Fruit* a small drupe with 2 plano-convex or ventrally concave cartilaginous or bony pyrenes. *Seeds* concave or grooved ventrally, the testa membranous; albumen horny; embryo short sub-basal; cotyledons cordate, thin; radicle thick, inferior.

Corolla-tube long, slender; lobes 5; fruit usually didymous:—

Leaves large, shining, ovate-oblong; flowers appearing with the leaves; corolla-tube short, the lobes longer than the tube; fruit obovoid, ·5 in. long ..... 1. *arabica.*

Leaves usually dull and small; corolla salver-shaped, the tube long and slender:—

Flowers appearing before the leaves; calyx-limb many-toothed and usually red-glandular; stipules spinescent, pyrenes cartilaginous:—

Leaves membranous, elliptic, acuminate at apex and base, 3 in. long or longer; fruit ovoid-oblong or obovoid, sub-didymous, ·4 in. long ..... 2. *bengalensis.*

Leaves subcoriaceous, ovate, ·5–1·5 in. long; fruit didymous, ·25 in. long, ·35 in. broad..... 3. *Wightiana.*

Flowers appearing with the leaves; calyx-limb entire or toothed, often red-glandular; stipules shortly connated; fruit obovoid, ·35 in. long, the pyrenes bony; leaves membranous, lanceolate, acuminate, up to 4 in long..... 4 *travancorensis.*

Corolla-tube very short, lobes 4; leaves coriaceous, shining, elliptic, about 3 in. long, 1·5 in. broad; stipules triangular, acuminate; fruit ellipsoid, ·3–·4 in. long, the seeds rugose..... 5. *crassifolia*

1. COFFEA ARABICA, Linn.; F. B. I. iii. 153; W. & A. 435, Wt. Ic. t. 53.

Cultivated and often found run wild in the hills of the W. Ghâts. **The Coffee plant.**

A large shrub with white flowers, formerly much cultivated, less so at present, since a fungoid disease ruined many plantations.

2. COFFEA BENGALENSIS, Roxb.; F. B. I. iii. 153; W. & A. 435.

E. Ghâts, hills of Ganjam (Barber).

A shrub with slender branches and fragrant white flowers.

3. COFFEA WIGHTIANA, W. & A. 436; F. B. I. iii. 154; Wt. Ic. t. 1598.

Deccan and Carnatic, near the E. foot of the Ghâts, on dry lands.

A branching almost thorny shrub with pale divaricate branches and white flowers.

4. COFFEA TRAVANCORENSIS, W. & A. 345; F. B. I. iii. 154; Trim. Fl. Ceyl. t. 53; Hook. Bot. Mag. 6749.

W. Ghâts, in Malabar and Travancore, in forest undergrowth, up to 3,000 ft., the flowers white and sweet-scented.

A slender undershrub with thin leaves and white flowers.

5. COFFEA CRASSIFOLIA, Gamble in Kew Bull. 1920, 248.

W. Ghâts, in the Anamalai Hills and hills of Travancore, at about 4,500 ft.

A stiff shrub with thick branches and leaves and very small greenish flowers.

Coffea liberica, Hiern, the Liberian coffee, is often planted, and has in some places replaced the Arabian plant.

33. Psychotria, Linn.

Small trees or shrubs, rarely herbs, erect or rarely climbing. *Leaves* opposite, rarely whorled, often pitted in the nerve-axils; stipules intrapetiolar, often connate, solitary or in pairs, often with glandular hairs within. *Flowers* in terminal, rarely axillary, cymes heads or fascicles, bracteate and bracteolate or not. *Calyx*-limb short, lobes usually small, usually persistent in fruit. *Corolla*-tube short, straight, usually with a ring of hairs within; lobes 5, rarely 4 or 6, valvate in bud. *Stamens* as many as the corolla-lobes, inserted on the throat or mouth of the corolla; anthers oblong or linear. *Ovary* 2-celled; ovules solitary in each cell, basal, erect; style short, with 2 stigmatic branches. *Fruit* ovoid, globose or oblong, with two plano-convex pyrenes, each 1-seeded, the pyrenes smooth or furrowed. *Seeds* plano-convex, often furrowed, the face usually flat; testa thin; albumen ruminate or not; cotyledons leafy, small; radicle inferior.

Pyrenes plano-convex, usually dorsally smooth, ventrally flat, albumen ruminate:—

Flowers mixed with rufous hairs; stipules with long hairs within:—

Inflorescence globular-capitate, pedunculate; calyx-lobes broadly obovate ciliate; leaves oblong-oblanceolate, abruptly acute, up to 6 in. long by 1·5–2 in. broad, with 12–18 pairs of scarcely prominent nerves, olive-green when dry.....1. *globicephala*.

Branches of inflorescence whorled, the end ones capitate, calyx

lobes triangular; leaves obovate or oblanceolate, abruptly acuminate, up to 8 in. long, 3 in. broad, with 12–15 pairs of prominent nerves looped near the margin, greenish when dry
2. *Thwaitesii.*

Branches of inflorescence opposite, the end ones cymose, calyx-lobes minute; leaves obovate or oblanceolate, abruptly acuminate, up to 5 in. long, 1·5 in. broad, with about 8–10 pairs of prominent looped nerves, yellowish when dry .... 3. *Johnsoni.*

Flowers not mixed with rufous hairs:—

Branches of inflorescence whorled:—

Nerves of the obovate leaves strong and parallel:—

Bracts and bracteoles large and persistent, calyx-tube broadly campanulate, the lobes obtuse and emarginate; leaves coriaceous, large, obtuse, with 12–20 pairs of strong nerves, up to 10 in. long, 3·5 in. broad .... 4. *Dalzellii.*

Bracts and bracteoles none or very early deciduous:—

Leaves rather small, under 5 in. long, about 1·5 in. broad, cuneate at base, rounded and then acute at apex, nerves 8–12 pairs, stipules ovate, densely woolly within; calyx-teeth rounded or acute, ciliate; cymes usually closely congested, 1 in. broad ..... 5. *congesta.*

Leaves large, up to 8 in. long, 4 in. broad, cuneate at base, rounded and very shortly apiculate at apex, nerves 10–14 pairs, regularly curved, stipules large, oblong; calyx-limb truncate; cymes spreading, 4 in. in diam. in fruit
6. *truncata.*

Nerves of the oblanceolate or oblong leaves parallel but weak:—

Leaf-nerves close, ·3 in. apart on midrib, the leaves dark when dry and wrinkled, much cuneate at base, acute at apex; corolla-tube long, cylindric, glabrous within, calyx-limb truncate; fruit moderate-sized, globose.... 7. *nudiflora.*

Leaf-nerves distant, ·5 in. or more apart on midrib, the leaves olive-green when dry, slightly cuneate at base, obtuse or obtusely acute at apex; corolla-tube very short, woolly within; calyx-limb shortly lobed; fruit large, ellipsoid
8. *macrocarpa.*

Branches of inflorescence opposite:—

Inflorescence spreading, corymbiform:—

Leaf-nerves many, rather close, up to ·5 in. apart on midrib, parallel, the leaves elliptic-oblong, coriaceous, acute at apex short-petioled; all the cyme branches spreading; the ultimate branchlets cymose ..... 9. *flavida.*

Leaf-nerves few, distant, over ·5 in. apart on midrib, irregular; the leaves elliptic-lanceolate, membranous, obtusely acute, or obtuse at apex, long-petioled; lower pair of cyme-branches long-spreading, ultimate branchlets with capitate flowers .... 10. *subintegra.*

Inflorescence elongate, racemiform, the branches short; leaves obovate or oblanceolate, cuneate at base, the 10–20 pairs of nerves parallel, about ·3–·4 in. apart on the midrib; calyx-lobes short; fruit globose, ·25 in. in diam. ... . 11. *elongata.*

Pyrenes plano-convex, smooth or furrowed on the back, albumen not ruminate:—

Pyrenes with two furrows on the back:—

Bracts and bracteoles conspicuous, persistent and connate, lanceolate, acuminate; cymes large, terminal and axillary, spreading, corymbose, the flowers small; leaves coriaceous, shining, oblanceolate, acuminate, up to 7 in. long. 2·5 in. broad, with about 12 pairs of nerves..... 12. *connata.*

Bracts and bracteoles inconspicuous or 0:—

Leaves short-petioled, obovate, cuneate at base, 2–5 in. long, 1–2 in. broad, glabrous, with about 8 pairs of nerves; cymes terminal, small, scarcely 1 in. in diam.; fruit about ·4 in. long 13. *bisulcata.*

Leaves very long-petioled, oblanceolate, much narrowed at base, 8–10 in. long, 2–2·5 in. broad, glabrous, nerves 8–12 pairs; cymes large, terminal, corymbose, about 3 in. in diam.; fruit oblong, ·6 in. long, the dorsal ridge very prominent 14. *anamallayana.*

Pyrenes with 4 furrows on the back:—

Climbing shrub; leaves elliptic or elliptic-obovate, acute, up to 3·5 in. long, 1·5 in. broad; cymes corymbose, about 3 in. in diam., the pedicels curved; fruit ·2 in. long, strongly ribbed 15. *sarmentosa*

Erect shrubs:—

Leaves long-petioled, membranous, broadly obovate, abruptly apiculate, up to 6 in. long, 3·5 in. broad, glabrous, with about 15 pairs of nerves; cymes corymbose, 3·5 in. in diam.; calyx-lobes lanceolate; fruit ·4 in. long, strongly 4-furrowed, crowned by the persistent calyx-lobes.....16. *Barberi.*

Leaves long-petioled, submembranous, elliptic or elliptic-obovate, rusty pubescent beneath on the nerves (16 or more pairs), pubescent between them; cymes globose, pedunculate or sessile, with prominent bracts and bracteoles, densely rufous-

villous; calyx-lobes lanceolate, villous; fruit ·2 in. long, villous, deeply furrowed.....17. *fulva*.

Leaves with petioles up to ·5 in. long, submembranous, obovate or oblanceolate, abruptly acuminate, glabrous, 3-6 in. long, 1—2 in. broad; cymes spreading, corymbose, the branches flattened; calyx-lobes minute, triangular: fruit obovoid, ·3 in. long, prominently ridged and rugose ..... 18. *octosulcata*.

1. PSYCHOTRIA GLOBICEPHALA, Gamble in Kew Bull. 1920, 249.
W. Ghâts, hills of Courtallum in Tinnevelly (Wight).
A shrub conspicuous for its globose flower-heads and longish leaves.

2. PSYCHOTRIA THWAITESII, Hook. f; F. B. I. iii. 162. *Grumilea nigra*, Gaertn. Fruct. 138, t. 28. ?.
W. Ghâts, especially in the Anamalais and the hills of Travancore and Tinnevelly, up to 5,000 ft., in damp forests.
A glabrous shrub with greenish flowers.

3. PSYCHOTRIA JOHNSONI, Hook, f.; F. B. I. iii. 175.
W. Coast, in Malabar and Cochin extending inland to the Atamalai hills of Coimbatore and Sispara Ghât in Nilgiris to about 5,000 ft.
A glabrous shrub.

4. PSYCHOTRIA DALZELLII, Hook. f.; F. B. I. iii. 163. *P. bracteata*, W. & A. 434, *not of* DC.
W. Coast, in S. Canara, Malabar and Cochin.
A stout glabrous shrub, the fruit ·4 in. long crowned by the calyx-teeth, the bracts prominent, as are the stipules.

5. PSYCHOTRIA CONGESTA, Hook. f.; F. B. I. iii. 162. *Grumilea congesta*, W. & A. 432; Wt. Ic. t. 1037.
W. Ghâts, in Sholas of the Nilgiris and Pulneys, above 7,000 ft., common on Doddabetta.
A large shrub or small tree with purplish-black fruit and greenish-white flowers. Bark light brown, smooth; wood white and close-grained.

Var. *astephana*, Hook. f. Cymes less crowded and longer peduncled.
Pulney Hills, with the common form.

6. PSYCHOTRIA TRUNCATA, Wall.; F. B. I. iii. 163; W. & A. 433.
W. Ghâts, from S. Canara and the Bababudan Hills of Mysore southwards to the Nilgiris and the Atamalai Sholas of Coimbatore, at 4,000–6,000 ft.

A large and handsome shrub with waxy-white corolla and black fruits.

7. PSYCHOTRIA NUDIFLORA, W. & A. 434; F. B. I. iii. 175.
W. Ghâts, hills of Tinnevelly and Travancore, about 4,000–6,000 ft., common about Courtallum.
A large glabrous shrub.

8. PSYCHOTRIA MACROCARPA, Hook. f.; F. B. I. iii. 162.
W. Ghâts, hills of Travancore and Tinnevelly, about 2,000–4,000 ft.
A large shrub with pale branchlets.

9. PSYCHOTRIA FLAVIDA, Talbot Trees and Shrubs Bomb. ed. 1. 113.
W. Ghâts, and W. Coast from S. Canara to Travancore.
A small shrub, the cyme branches turning yellow in fruit.

10. PSYCHOTRIA SUBINTEGRA, Hook. f.; F. B. I. iii. 162. *Grumilea subinteger*, W. & A. 432.
W. Ghâts, Pulney Hills and Sivagiri Hills of Tinnevelly.
A large shrub, the cyme rhachis arrested above the lowest pair of branches.

11. PSYCHOTRIA ELONGATA, Hook. f.; F. B. I. iii. 163. *Grumilea elongata*, Wt. Ic. t. 1036.
W Ghâts, Nilgiris, Anamalais, Pulneys and hills of Tinnevelly and Travancore, about 4,000–7,000 ft., in Shola forests.
A large shrub, the pits in the nerve-axils of the leaves very conspicuous, the stipules sheathing, the flowers greenish. Bark brown, thin; wood reddish-white, close-grained.

12. PSYCHOTRIA CONNATA, Wall.; F. B. I. iii. 171; W. & A. 433. *P. laevigata*, W. & A. 433; Wt. Ic. t. 828.
W. Ghâts, hills of Travancore and Tinnevelly, about 4,000–6,000 ft., in evergreen forests.
A glabrous shrub, the pyrenes with 2 deep furrows.

13. PSYCHOTRIA BISULCATA, W. & A. 434; F. B. I. iii. 171; Wt. Ic. t. 1039; Trimen Fl. Ceyl. t. 54.
W. Ghâts, Nilgiri Sholas, above 4,000 ft., common.
A large shrub with greenish flowers and purplish-black fruit. Bark light brown, corky; wood grey, moderately hard.

14. PSYCHOTRIA ANAMALLAYANA, Bedd. Ic. t. 236; F. B. I. iii. 171

W. Ghâts, Anamalai Hills and hills of Travancore, at 3,000–4,500 ft., generally on river banks.

A small tree with white flowers and purple fruit.

15. PSYCHOTRIA SARMENTOSA, Bl.; F. B. I. iii. 165; Wt. Ic. t. 1038.

W. Coast, in Malabar, apparently scarce; W. Ghâts.

A climbing and rooting plant with white fleshy fruit; the ribs and furrows only showing when dry.

16. PSYCHOTRIA BARBÉRI, Gamble in Kew Bull. 1920, 248.

W. Ghâts, Anamalai Hills (Barber), Travancore Hills at 4,500 ft. (Venkoba Row).

A shrub, the leaves black when dry.

17. PSYCHOTRIA FULVA, Ham.; F. B. I. iii. 169.

E. Ghâts, Gudem and Gomanji in the hills of Vizagapatam, to 4,000 ft. (A. W. Lushington).

A large shrub with large membranous rusty-pubescent leaves and yellowish flowers on pedunculate cymes.

Var. *madraspatana*. *P. madraspatana*, Hook. f.; F. B. I. iii. 167. A stouter plant with larger leaves and flowers in sessile heads (Herb. Madras & Wall. Coll. 8366).

E. Ghâts, Onjeri in the Vizagapatam Hills at 3,800 ft. (A. W. Lushington).

18. PSYCHOTRIA OCTOSULCATA, Talbot in Journ. Bomb. Nat. Hist. Soc. xi. 237, t. 7.

W. Ghâts, Maliyamadurgam, Coimbatore, 4,000 ft. (Fischer), Kotagiri Ghât in Nilgiris, 2,300 ft. (Fischer).

An erect shrub with pale leaves, white flowers and black fruit.

34. Chasalia, Comm.

Shrubs or small trees; branchlets terete. *Leaves* opposite or ternately whorled, petiolate; stipules intrapetiolar, usually bifid. *Flowers* in terminal cymes; bracts and bracteoles small. *Calyx*-tube ovoid or subglobose, lobes 5, short. *Corolla*-tube elongate, slender and usually curved; lobes 5, short, valvate. *Stamens* 5, inserted in the corolla-tube; anthers long; filaments short or 0. *Disk* large, annular or tumid. *Ovary* 2-celled; ovule 1 in each cell, erect; style long, with 2 stigmatic lobes. *Fruit* dry or slightly fleshy, of 2 pyrenes, ventrally grooved, dorsally rounded. *Seeds* orbicular, rounded on the back, ventrally very concave;

testa membranous; albumen horny; cotyledons broad; radicle terete, inferior.

CHASALIA CURVIFLORA, Thw.; F. B. I. iii. 176. *Psychotria curviflora*, Wall. in Roxb. Fl. Ind. Ed. Carey & Wall. ii. 167. *Psychotria ambigua*, W. & A. 433; Wt. Ill. t. 127.

E. Ghâts, hills of Vizagapatam at about 3,000 ft.; W. Ghâts, in all Districts, in evergreen forests up to 5,000 ft., common. A small shrub with membranous leaves very variable in size and shape, but usually elliptic-lanceolate or -oblanceolate, acuminate at apex, much narrowed at base to a long slender petiole; flowers pinkish-white; fruit purplish-black.

35. Geophila, D. Don.

Small, slender, perennial herbs, creeping and rooting. *Leaves* long-petioled; stipules interpetiolar, entire. *Flowers* small, solitary or umbelled, subsessile or on axillary or terminal peduncles; bracts subulate, linear or leafy. *Calyx*-tube obovoid; limb short, 5–7-lobed, the lobes persistent. *Corolla* elongate, funnel-shaped, the throat hairy; lobes 5–7, spreading or recurved, valvate. *Stamens* 4–7, inserted on the corolla-tube; filaments filiform; anthers linear. *Ovary* 2-celled; ovule 1 in each cell, erect; style slender, with 2 stigmatic branches. *Fruit* a fleshy drupe with 2 plano-convex pyrenes; testa membranous; albumen horny; embryo minute; radicle inferior.

GEOPHILA RENIFORMIS, D. Don F. B. I. iii. 178; W. & A. 436; Wt. Ic. t. 54.

W. Ghâts, in most Districts, about 2,000–5,000 ft., not common.

Leaves small, orbicular, cordate, on long petioles; fruit scarlet when ripe.

36. Fergusonia, Hook. f.

A slender prostrate herb, the stems rooting from the lower nodes; branchlets acutely 4-angled, the nodes ciliate. *Leaves* subsessile, lanceolate, scabrous, 1-nerved; stipules connate with the petioles, lanceolate, bristly-ciliate, persistent. *Flowers* small, axillary, shortly pedicelled; bracteoles 2. *Calyx*-tube campanulate; lobes 4, erect, lanceolate, bristly-ciliate, persistent. *Corolla*-tube funnel-shaped, usually villous at the throat within; lobes 4, ovate, acute, valvate, the tips ciliate. *Stamens* 4, inserted between

the corolla-lobes; filaments short; anthers linear-oblong. *Ovary* 4-celled, ovule 1 in each cell, erect; style filiform with 2 stigmatic lobes. *Fruit* of 4 separable cocci, each crowned by 1 calyx-lobe. *Seeds* oblong; albumen fleshy; cotyledons ovate, small; radicle inferior.

FERGUSONIA TETRACOCCA, Baill. *F. zeylanica*, Hook. f.; F. B. I. iii. 48. *Borreria tetracocca*, Thw.; Bedd. Ic. t. 39.

W. Ghâts, in Coorg (Beddome); S. Canara (Barber); Travancore (K. Rangachari).

A scabrous herb, in appearance like *Oldenlandia nitida*.

37. Lasianthus, Jack.

Shrubs, often bad-smelling; branchlets terete, compressed at the nodes. *Leaves* distichous, shortly petioled, with arching nerves, the last pair often to the apex, and usually closely-set transverse nervules; stipules interpetiolar, usually broad. *Flowers* small, in axillary, rarely peduncled, often bracteate, clustered cymes or heads. *Calyx*-tube subglobose, ovoid or oblong; limb short or long; lobes 3–7, valvate in bud, or 0. *Corolla* funnel- or salver-shaped, the throat villous; lobes 3–7, valvate. *Stamens* on the throat of the corolla; filaments short; anthers oblong, often apiculate, included. *Ovary* 4–9-celled; ovules solitary in each cell, erect; style short or long, with 3–9 short, obtuse, stigmatic lobes. *Fruit* a drupe of 4–9 pyrenes; pyrenes triquetrous, crustaceous or bony, usually rugose. *Seeds* narrow; testa membranous; albumen fleshy; embryo oblong, curved, with short obtuse cotyledons and slender inferior radicle.

Cymes sessile, bracteate:—

Bracts conspicuous, longer than the flowers, lanceolate; branchlets softly hirsute; leaves subsessile, oblong or somewhat oblanceolate; abruptly and sharply caudate-acuminate at apex, rounded at base, 4–6 in. long, 1·5–2·5 in. broad, nerves 6–7 pairs, transverse nervules subparallel, little branched; calyx-teeth ovate-lanceolate

1. *Jackianus.*

Bracts inconspicuous, shorter than the flowers, ovate; branchlets glabrous, rest slightly strigose-villous; leaves shortly petioled, oblong or elliptic-oblong, abruptly caudate-acuminate at apex, rounded or acute at base, 6–7 in. long, 2–2·5 in. broad, nerves 7 pairs, transverse nervules close, little branched, very prominent beneath; calyx-teeth triangular-lanceolate.....2. *oblongifolius.*

Cymes sessile, with minute or no bracts : –

Calyx-limb and -teeth glabrous or very slightly hairy only :—

Calyx-teeth erect, lanceolate, with few hairs near the tip, ·2 in. long; branchlets glabrous; leaves stoutly petioled, elliptic, abruptly caudate-acuminate at apex, 3-6 in. long, 1–2 in. broad, nerves 5 pairs, prominent, arching, the last pair and the midrib running to the apex, transverse nervules horizontal, slender, nearly straight . . .. 3. *Blumeanus.*

Calyx-teeth ovate, acute, puberulous, ·05-·075 in. long; branchlets black, glabrous, leaves obovate, obtuse, coriaceous, 1 in. long, ·7 in. broad, the margins recurved, nerves 4–5 pairs, indistinct, as are the transverse nervules . . . . . 4. *obovatus.*

Calyx-teeth minute, obtuse, slightly puberulous only; branchlets glabrous; leaves petioled, small, obovate, abruptly acuminate and mucronate at apex, acute at base, 1·5-2 in. long, ·6–1 in. broad, nerves 3-4 pairs, prominent, arching, transverse nervules horizontal, very many, forked, indistinct . . . . . 5. *parvifolius.*

Calyx-limb truncate; branchlets pubescent; leaves lanceolate, acuminate at both ends, mucronate at apex, 5-6 in. long, 1–1·5 in. broad, nerves 7–10 pairs, transverse nervules horizontal, prominent, parallel, about 12 per inch . . . . . 6. *truncatus.*

Calyx-limb and -teeth hairy :—

Leaves and branchlets glabrous or nearly so, transverse nervules horizontal, very many and close : –

Leaves elliptic or elliptic-obovate, abruptly acuminate, sharply mucronate, 3-4 in. long, up to 2 in. broad, nerves 3–6 pairs, arching; calyx-teeth very short, villous, triangular 7. *acuminatus.*

Leaves lanceolate or oblong-lanceolate, acuminate, mucronate, 3-4·5 in. long, ·75-1·5 in. broad, nerves 6–9 pairs, ascending; calyx-teeth lanceolate, villous . . . . . 8. *coffeoides.*

Leaves and branchlets more or less pubescent :—

Leaves beneath and branchlets merely closely appressed pubescent; leaves petioled, narrowly oblong-lanceolate, acuminate, 4–6 in. long, 1–1·5 in. broad, nerves 7–8 pairs, ascending, transverse nervules close and regular; calyx-teeth minute, triangular, hispid . . . . . 9 *strigillosus.*

Leaves beneath and branchlets hirsute with spreading hairs :—

Calyx-lobes oblong, ·1 in. long, hispid; leaves elliptic-oblong, acute or acuminate, margins ciliate, 4–7 in. long, 1·5–2 in. broad, nerves 6–8 pairs, ascending, the uppermost ones to the apex, transverse nervules stout, distant . . . . . 10. *ciliatus.*

Calyx-lobes triangular, acute, ·05 in. long, softly villous; leaves elliptic lanceolate or oblanceolate, cuspidate-acuminate, 3–6 in. long, 1·5 in. broad, nerves about 7 pairs, the uppermost pair to the apex, transverse nervules slender though distant.....11. *rostratus.*

Cymes peduncled :—

Cymes with slender peduncles, the transverse nervules parallel :—

Cymes dichotomous, at least 1 in. long; calyx-lobes long lanceolate, with setose tips; leaves thin, glabrous, ovate acuminate, rounded or cordate at base, 2–4 in. long, 1–nearly 2 in. broad, nerves 6–8 pairs, slender, transverse nervules very many, close-set and parallel, not prominent.....12. *dichotomus.*

Cymes about ·5 in. long, cinereous; calyx-lobes lanceolate, villous and setose; leaves subcoriaceous, grey-puberulous, oblong-lanceolate, caudate-acuminate and mucronate, 3-3·5 in. long, 1 1·5 in. broad, nerves 3–4 pairs; transverse nervules more distant, subparallel.....13. *cinereus*

Cymes with short stout peduncles, the transverse nervules reticulate :—

Calyx-lobes erect, subulate, hirsute, ·2–·25 in. long; leaves variable, elliptic ovate or oblong, acute acuminate or apiculate at apex, rounded at base, 1–4·5 in. long, 1–2 in. broad, nerves spreading, nervules much reticulate.....14. *venulosus*

Calyx-lobes recurved, ovate, obtuse, hirsute, ·05–·1 in. long; leaves variable, elliptic-ovate or oblong-lanceolate, acute at apex, acute or rounded at base, 4–6 in. long, 1–1·5 in. broad, nerves ascending, nervules less reticulate, prominent.....15. *capitulatus*

1. **Lasianthus Jackianus**, Wight; F. B. I. iii. 180; Bedd. Ic. t. 12.

W. Ghâts, in W. Nilgiris, Wynaad and Atapadi Valley in Malabar, Bolumpatti Valley in Coimbatore, at 3,000–5,000 ft., in evergreen forests.

An evergreen shrub, covered with bulbous-based strigose hairs.

2. **Lasianthus oblongifolius**, Bedd. Ic. t. 11; F. B. I. iii. 183.

W. Ghâts, Papanasham Hills of Tinnevelly, at 3,000–4,000 ft.

An evergreen shrub, the leaves very characteristic with prominent nervules.

3. **Lasianthus Blumeanus**, Wight; F. B. I. iii. 184; Bedd. Ic. t. 22.

W. Ghâts, Courtallum in Tinnevelly Hills at 3,500 ft., in evergreen forest.

An evergreen shrub, the calyx-lobes conspicuous.

4. LASIANTHUS OBOVATUS, Bedd. Ic. t. 10; F. B. I. iii. 186.

W. Ghâts, Atraimalai Hills of Travancore at 5,000 ft. (Beddome).

A much-branched, compact, small-leaved shrub.

5. LASIANTHUS PARVIFOLIUS, Wight; F. B. I iii. 186.

W. Ghâts, in the Nilgiris, Anamalais, Pulneys and hills of Tinnevelly about 4,000 ft.

A slender glabrous shrub with small shining leaves and few nerves.

6. LASIANTHUS TRUNCATUS, Bedd. Ic. t. 9; F. B. I. iii. 189.

E. Ghâts, Mahendragiri Hill in Ganjam at 4,500 ft. (Beddome), hills of Vizagapatam, 3,500 ft. (A. W. Lushington).

A shrub with narrow leaves and subsolitary long flowers.

7. LASIANTHUS ACUMINATUS, Wight; F. B. I. iii. 185 *in part.*

W. Ghâts, in the Nilgiris, Pulneys and hills of Tinnevelly and Travancore, at 3,000–6,000 ft., in evergreen Sholas.

A slender shrub with shining leaves.

8. LASIANTHUS COFFEOIDES, Fyson in Kew Bull. 1914. 185.

W. Ghats, in the Pulney Hills and hills of Travancore at 6,000–7,000 ft. in Shola forests.

A single-stemmed erect shrub with horizontal branches spreading like those of the coffee-plant. Very similar to the next species.

9. LASIANTHUS STRIGILLOSUS, Hook. f.; F. B. I. iii. 185.

W. Ghâts, Courtallum Hills of Tinnevelly.

A shrub with stiff leaves and well-marked nerves.

10. LASIANTHUS CILIATUS, Wight; F. B. I. iii. 184.

W. Ghâts, Sholas about Sispara in W. Nilgiris at 5,000–6,000 ft.

A stout shrub with tawny brown rusty tomentum and prominent leaf-nerves.

11. LASIANTHUS ROSTRATUS, Wight. *L. ciliatus* var. *rostratus*, Hook. f.; F. B. I. iii. 185.

W. Ghâts, hills of Madura, Tinnevelly and Travancore, at 4,000–5,000 ft., in evergreen Sholas.

A large shrub with soft brown tawny pubescence, the leaves very long, acuminate.

12. LASIANTHUS DICHOTOMUS. Wight; F. B. I. iii. 191; Bedd. Ic. t. 13.

W. Ghâts, Sivagiri and Courtallum Hills of Tinnevelly (Wight, Beddome).

A nearly glabrous shrub.

13. LASIANTHUS CINEREUS. Gamble in Kew Bull. 1920, 249.

W. Ghâts, hills of Tinnevelly at Naterikal and Kalivayalpil (Barber, Rangachari).

A shrub, cinereous pubescent, and with elongate branchlets, the leaves few-nerved.

14. LASIANTHUS VENULOSUS. Wight; F. B. I. iii. 190; Wt. Ic. t. 1032. *Santia venulosa*, W. & A. 422.

W. Ghâts, in the upper Shola Forests of Nilgiris and Pulneys, above 6,000 ft., in underwood, common.

A large much-branching shrub with yellowish flowers and blue fruits, the leaves reticulate. Bark light brown, rough with corky protuberances; wood grey, close-grained.

15. LASIANTHUS CAPITULATUS, Wight; F. B. I. iii. 191.

W. Ghats, Brumagiri Hills of Mysore, Atamalai Hills of Coimbatore (Fischer), Nilgiris, especially about Sispara on West and Lamb's rock on East, in underwood of Shola forests at 4,000–6,000 ft., Pulney Hills (Bourne).

A large shrub, perhaps the largest S. Indian species, the leaves variable in shape and coriaceous.

38. Saprosma, Blume.

Shrubs, usually glabrous, bad-smelling when bruised. *Leaves* opposite or 3–4-whorled, sessile or petioled; stipules interpetiolar, connate, with stiff bristles on the margin, deciduous. *Flowers* axillary or terminal, solitary fascicled or in cymes; bracts and bracteoles minute, often connate. *Calyx*-tube obconic; limb dilated, 4–6-lobed, persistent. *Corolla*-tube funnel-shaped or campanulate, the throat villous; lobes 4–5, broad, obtuse, valvate with inflexed flat or crisped margins. *Stamens* 4–5, in the corolla-throat; filaments short or 0; anthers oblong. *Fruit* a drupe with 1–2 thin crustaceous pyrenes. *Seeds* erect, plano-convex, smooth; testa membranous; albumen fleshy; cotyledons small, foliaceous; radicle elongate, truncate, inferior.

Flowers in small axillary or terminal cymes; leaves opposite :—

Leaves sessile or nearly so, one usually smaller, elliptic-ovate or obovate, acuminate, base rounded or subcordate, 2–5 in. long, 1–2 in. broad; flowers very small, terminal; seed 1, globose or ellipsoid ..... 1. *indicum.*

Leaves petioled, equal, elliptic or obovate, abruptly acuminate, narrowed at base; 3 4 in. long, 1·5 2 in. broad; flowers moderate-sized, the corolla-tube ·5 in. long, in terminal cymes; seed 1. 2. *fragrans.*

Flowers in slender 1 3-flowered terminal or axillary cymes, the corolla-tube ·5 in. long; leaves opposite, petioled, elliptic or lanceolate, acuminate, narrowed at base, 2 5 in. long, ·75–2 in. broad; seeds 2 ..... 3 *ceylanicum.*

Flowers in axillary or terminal corymbose cymes, the corolla-tube short; leaves 3–4-whorled, petioled, elliptic or lanceolate or oblanceolate, acuminate ..... 4. *corymbosum.*

1. SAPROSMA INDICUM, Dalz.; F. B. I. iii. 192. *Serissa glomerata* Bedd. Ic. t. 16.

W. Ghâts, from S. Canara to Travancore, at 2,000–4,000 ft., in evergreen forests.

A shrub, 3–4 ft. high, with white flowers and blue drupe.

2. SAPROSMA FRAGRANS, Bedd.; F. B. I. iii. 193. *Serissa fragrans*, Bedd. Ic. t. 14.

W. Ghâts, in W. Nilgiris, Malabar and Tinnevelly Hills, at 2,000–4,000 ft.

A shrub, 10–12 ft. high, with white fragrant flowers; bad-smelling when crushed.

3. SAPROSMA CEYLANICUM, Bedd. F. B. I. iii. 193. *Serissa Wightii*, Bedd. Ic. t. 15.

W. Ghâts, in the Nilgiris, Anamalais and Tinnevelly Hills, above 3,000 ft., in underwood of Shola forest.

A shrub, 8–12 ft. high, bad-smelling when bruised, with purplish flowers and deep blue drupe.

4. SAPROSMA CORYMBOSUM, Bedd.; F. B. I. iii. 194. *Serissa corymbosa*, Bedd. Ic. t. 17.

W. Ghâts, in evergreen forests of the Tinnevelly and Travancore Hills, at 2,500–4,000 ft.

A shrub with white flowers, the fruit so far unknown.

39. Hamiltonia, Roxb.

Erect shrubs with trichotomous branchlets, bad-smelling when

bruised. *Leaves* opposite, rarely ternate, petioled; stipules intrapetiolar, short, acute, often glandular, persistent. *Flowers* in broad terminal trichotomously branched panicles or subumbellate cymes, fragrant; bracts lanceolate; bracteoles subulate. *Calyx*-tube ovoid; limb persistent with 4–5 subulate often glandular lobes. *Corolla* funnel-shaped; tube elongate; lobes 5, valvate. *Stamens* 5, adnate to the throat of the corolla; filaments short, subulate; anthers obovate-oblong, obtuse. *Ovary* 5-celled, the septa soon disappearing; ovule 1 in each cell, erect; style filiform with 5 linear stigmatic arms. *Fruit* a 1-celled capsule, 5-valved at top. *Seeds* 5 or less, 3-cornered; testa reticulate, splitting into 3–4 segments; cotyledons cordate, induplicate; radicle terete, inferior.

HAMILTONIA SUAVEOLENS, Roxb.; F. B. I. iii. 197. *H. mysorensis*, W. & A. 423. *Spermadictyon suaveolens*, Roxb. Cor. Pl. t. 236.

N. Circars and Deccan, in dry forests, south to Mysore, up to 4,500 ft.

A large shrub with white or blue flowers and rather large glabrous or pubescent leaves, up to 1 ft. in length. Bark grey, peeling off in papery flakes; wood dark grey, soft.

40. Morinda, Linn.

Erect or climbing shrubs or trees; branchlets terete or obscurely 4-gonous. *Leaves* opposite, rarely ternate; stipules connate, sheathing. *Flowers* in axillary or terminal, simple panicled or umbellate heads, the calices more or less coherent; bracts 0. *Calyx*-tube urceolate or hemispheric; limb short, truncate or occasionally with one large leafy bract-like lobe. *Corolla*-tube more or less funnel-shaped, short or long; lobes 4 or 5, occasionally more, valvate in bud. *Stamens* as many as the corolla-lobes, on the throat of the corolla; filaments short; anthers linear or oblong. *Ovary* 2- or spuriously 4-celled; ovules solitary, ascending from near the base of the septum; style slender, with 2 stigmatic branches. *Fruit* a syncarpium formed by the succulent enlarged calices, showing many more or less 4-sided pyramidal sections each with 4 cartilaginous or bony pyrenes, rarely of nearly free drupes; the pyrenes often with an empty ventral cavity. *Seeds* oblong or obovoid; testa membranous, sometimes produced below in a reticulate wing; albumen fleshy or horny; cotyledons small; radicle long, inferior.

Trees or shrubs, erect; corolla-tube elongate:—

Pyrenes with an empty ventral cavity; seeds winged below; fruit about 1 in. in diam.:—

Calyx-limb with or without a leafy bract-like lobe; leaves glabrous, shining, 5–9 in. long, 3–5 in. broad, elliptic, acute, nerves 8–10 pairs; stipules broad, obtuse; fruit white or greenish 1. *citrifolia.*

Calyx-limb without a leafy lobe; leaves glabrous, up to 12 in. long, obovate or oblanceolate or lanceolate; nerves 10 pairs; stipules acute; fruit white .....2. *angustifolia.*

Pyrenes without an empty ventral cavity; seeds not winged; fruit usually less than ·75 in. in diam.; leaves usually pubescent or tomentose, up to 6 in. long, various in shape; stipules usually bifid .....3. *tinctoria.*

Climbing shrubs; corolla-tube short, very hairy within; pyrenes pyriform, triquetrous; seeds not winged:—

Calyx-limb a mere rim, truncate; leaves elliptic-lanceolate or -oblanceolate, sometimes obovate, abruptly acuminate, usually pubescent, membranous, nerves 6 8 pairs at about 30° with midrib .....4. *umbellata.*

Calyx-limb a fleshy cushion-like ring; leaves oblanceolate or linear-oblong, abruptly caudate-acuminate, coriaceous, glabrous; nerves 10–12 pairs at about 60° with midrib, reticulation prominent 5. *reticulata.*

1. MORINDA CITRIFOLIA, Linn; F. B. I. iii. 155; W. & A. 419. *M. bracteata*, Roxb.; W. & A. 419; Wt. Ill. t. 126.

N. Circars, in coast forests; W. Coast, in coast forests from S. Canara to Travancore: sometimes cultivated.

A small tree with white flowers and large fleshy fruit. The roots give a red dye from the wood. Bark yellowish-white. Vern. *Hind.* Al, Ak; *Ur.* Achu; *Tam.* Nuna; *Mal.* Manjanatthi.

2. MORINDA ANGUSTIFOLIA, Roxb. Cor. Pl. t. 237; F. B. I. iii. 156.

N. Circars, Vizianagram (J. Campbell); Nallamalai Hills of Kurnool (Barber).

A small tree with thicker leaves, prominently nerved.

3. MORINDA TINCTORIA, Roxb.; F. B. I. iii. 156; W. & A. 419. *M. exserta*, Roxb.; W. & A. 419. *M. citrifolia*, Bedd. Fl. t. 220, *not of* Linn.

S. Deccan and Carnatic to S. Travancore in dry forests, westwards to the E. slopes of the Ghâts, at low levels.

A moderate-sized deciduous tree. Vern. *Tel.* Togari: Maddi; *Tam.* Nuna.

Var. *tomentosa*, Hook f.; F. B. I. iii. 156. *M. tomentosa*, Heyne; W. & A. 426. Leaves tomentose on both surfaces, larger and broader; corolla-tube more slender.

N. Circars and N. Deccan in dry forests, the common Northern form.

A moderate-sized deciduous tree. Bark corky, brown or grey; wood red or yellow, moderately hard. The root gives a red or yellow dye. Vern. *Ur.* Achu; *Tel.* Maddi.

Var. *stenophylla*, Gamble. *M. stenophylla*, Spr.; W. & A. 420. Leaves narrowly linear-oblong, tomentose, up to 6 in. long by 1 in. broad; stipules variable, sometimes long.

Chittoor and Tinnevelly (Beddome).

4. MORINDA UMBELLATA, Linn.; F. B. I. iii. 157; W. & A. 420.

E. Ghâts, Madgol Hills of Vizagapatam at 4,000-5,000 ft.: Deccan, Kambakam Hill in Chingleput, Horsleykonda in Chittoor at 4,000 ft., hills of N. Coimbatore; W. Ghâts, in all Districts, up to 5,000 ft.

A diffuse, climbing shrub, with rather variable, usually membranous leaves and flowers in many-branched terminal umbels, the fruits occasionally separate.

5. MORINDA RETICULATA, Gamble in Kew Bull. 1920, 248.

W. Ghâts, hills of Travancore at about 2,000 ft. (Bourdillon, Rama Row).

A climbing shrub with coriaceous shining reticulate leaves.

41. Prismatomeris, Thw.

Shrubs, the branchlets compressed tetragonous. *Leaves* lanceolate, petiolate; stipules interpetiolar, cuspidate. *Flowers* white, in axillary few-flowered fascicles or cymes, pedicels usually long. *Calyx*-limb cup-shaped teeth 4-5, short. *Corolla*-tube cylindric; lobes 4-5, spreading, valvate in bud. *Stamens* 4-5, in the corolla-tube; filaments short; anthers linear, included. *Ovary* 2-celled, 1 ovule in each cell, the ovule pendulous, attached above the middle of the septum; style linear; stigmas 2, spreading. *Fruit* a small fleshy 1-2-celled, 1-2-seeded berry with 2 pyrenes.

Seeds hemispheric, ventrally excavated; testa membranous; cotyledons small, reniform; radicle inferior.

PRISMATOMERIS ALBIDIFLORA, Thw.; F. B. I. iii. 159; Bedd. Ic. t. 93 (*but corolla-lobes not imbricate*).

Travancore, in evergreen forests at low elevations (Bourdillon).

A fragrant shrub with pretty white flowers and dark blue fruits.

42. Hydrophylax, Linn. f.

Succulent creeping herbs with rooting stems. *Leaves* sessile, ovate or obovate, often recurved; stipules connate with the petioles in an entire or toothed sheath. *Flowers* solitary, axillary, shortly pedicelled. *Calyx*-tube 4-angled; lobes 4, ovate-lanceolate, persistent. *Corolla* subfleshy, funnel-shaped, with a ring of hairs within; lobes 4, ovate, valvate. *Stamens* 4, exserted, on the throat of the corolla; filaments slender; anthers linear. *Ovary* 2-celled; ovule 1 in each cell, peltately attached to the septum; style filiform; stigma obscurely 2-lobed. *Fruit* large, corky, compressed, acutely keeled, 1–2-celled, 2-seeded. *Seeds* linear oblong, dorsally convex, ventrally 2-grooved; testa granular; albumen cartilaginous; cotyledons thin, oblong; radicle terete, elongate, inferior.

HYDROPHYLAX MARITIMA, Linn. f.; Roxb. Cor. Pl. t. 233; F. B. I. iii. 199; W. & A. 441; Wt. Ic. t. 760.

East and West Coasts, on sand-dunes.

A succulent herb with lilac flowers and corky fruit; a useful sand-binding plant.

43. Borreria, G. F. W. Mey.

Annual or perennial herbs, the branches usually 4-gonous. *Leaves* opposite, sessile or petioled; stipules connate with the petioles in a broad truncate tube with marginal bristles. *Flowers* very small, in axillary or terminal fascicles; bracteoles many, of soft filiform bristles. *Calyx*-tube obovoid or turbinate; lobes 2–4, often with intermediate teeth or bristles. *Corolla* funnel-shaped or hypocrateriform; lobes 4, valvate. *Stamens* 4, on the throat or tube of the corolla; anthers linear or oblong. *Ovary* 2-celled; ovules solitary in each cell on septal placentas; style filiform with 2 short arms or stigma capitate. *Fruit* of 2 coriaceous or crustaceous mericarps which dehisce ventrally, the

membranous septum sometimes remaining. *Seed* oblong, ventrally grooved; testa thin; albumen horny or fleshy; cotyledons small, foliaceous; radicle terete, inferior.

Stems erect; mericarps thinly crustaceous, dehiscing ventrally without a persistent septum:—

Slender little branched scabrid herbs with linear or lanceolate leaves ..... 1. *stricta.*

Branching bushy nearly glabrous herbs with ovate obovate or lanceolate leaves ..... 2. *ocymoides.*

Stems procumbent, hispid or scabrous, with usually long internodes; mericarps coriaceous, dehiscing ventrally, the septum persistent 3. *hispida.*

1. BORRERIA STRICTA, K. Sch. *Spermacoce stricta*, Linn. f.; F. B. I. iii. 200. *Bigelovia lasiocarpa* and *Roxburghiana*, W. & A. 437.

   All Districts, and up to 5,000 ft. in the hills, usually in forest undergrowth, common.

   An erect herb, variable in leaf, flowers white, the tube short.

2. BORRERIA OCYMOIDES, DC. *Spermacoce ocymoides*, Burm.; F. B. I. iii. 200.

   All Western Districts, in the hills to about 5,000 ft.

   A branching herb, sometimes difficult to distinguish from *B. stricta.*

3. BORRERIA HISPIDA, K. Sch. *Spermacoce hispida*, Linn.; F. B. I. iii. 200; W. & A. 438.

   All Districts, and up to about 3,000 ft. in the hills, common on the coast sands, also on all dry lands in the interior.

   A hispid procumbent herb with long branches, pale mauve usually long-tubed flowers and hard fruits. Vern. *Tel.* Madana; *Tam.* Nutti choori.

44. Rubia, Linn.

Herbs, erect diffuse or climbing, hispid or prickly; stems slender, 4-gonous. *Leaves* in whorls of 4–8, rarely opposite; stipules none. *Flowers* very small, in axillary and terminal cymes, bracteolate; pedicels articulate below the ovary. *Calyx*-tube ovoid or globose; limb 0. *Corolla* rotate or shortly campanulate; lobes usually five, valvate. *Stamens* alternate with

the corolla-lobes; filaments short; anthers globose or oblong. *Ovary* 2-celled; ovules solitary in the cells, attached to the septum; style bifid or styles 2; stigmas capitate. *Fruit* small, fleshy, didymous or globose by the suppression of 1 carpel. *Seed* suberect, adnate to the pericarp; testa membranous; albumen horny; embryo curved, the cotyledons thin, foliaceous; radicle slender, inferior.

RUBIA CORDIFOLIA, Linn.; F. B. I. iii. 202; W. & A. 442; Wt. Ill. t. 128, fig. 1. *R. Munjista*, Roxb.; Wt. Ic. t. 187.

N. Circars, hills of Ganjam to Godavari; Deccan and Carnatic, in hilly country; W. Ghâts, in all Districts up to 7,000 ft. Indian Madder.

A climbing, very scabrous herb with ovate cordate 5–7-ribbed long-petioled leaves, small greenish flowers and purplish fruit. The roots give a valuable dye. Vern. *Hind.* Manji't; *Tel.* Mandesti; *Tam.* Manjiti.

45. Galium, Linn.

Herbs, erect or climbing; stems slender, weak, 4-gonous. *Leaves* 3 or more in a whorl with stipules 0, rarely opposite and stipulate? *Flowers* minute, in axillary or terminal cymes o panicles, white yellow or greenish, bracteolate; pedicels articu late below the ovary. *Calyx*-tube ovoid or globose, limb 0 *Corolla* rotate or shortly funnel-shaped; lobes 4, rarely 3, valvate. *Stamens* alternate with the corolla-lobes; filaments short; anthers didymous. *Ovary* 2-celled; ovules solitary in the cells, attached to the septum; style short, bifid; stigmas capitate. *Fruit* small, dry, didymous, smooth granulate or tubercled, glabrous or pubescent, often with hooked hairs. *Seed* adherent to the pericarp, plano-convex, ventrally grooved; testa membranous; albumen horny; embryo curved; cotyledons thin, foliaceous; radicle elongate, inferior.

Leaves 4, ovate, apiculate, soft and softly hairy; fruit with hooked hairs..... ....1. *javanicum.*
Leaves 6–8, obovate or oblanceolate, apiculate, hard and scabrous fruit glabrous, minutely granulate..... .....2. *asperifolium*

1. GALIUM JAVANICUM, DC. *G. rotundifolium*, Linn. var *javanicum*, Hook. f.; F. B. I. iii. 205. *G. Requienianum*.

W. & A. 443; Wt. Ic. t. 1042 (*except the hairs of the fruit*).

W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Tinnevelly, above 6,000 ft.

A low-growing plant of grassy places.

2. **GALIUM ASPERIFOLIUM**, Wall.; W. & A. 442; Wt. Ill. t. 128, fig. 1. *G. Mollugo*, Hook. f.; F. B. I. iii. 207, *not of* Linn.

N. Circars, Mahendragiri Hill in Ganjam, 4,500 ft.; W. Ghâts, Nilgiris and Pulneys, above 5,000 ft.

A scandent, rambling, scabrous herb.

Family LXXXIV. VALERIANACEAE.

Herbs, annual or perennial, or rarely shrubs. *Leaves* opposite, exstipulate, but often the petioles united at the base by a rim, entire pinnatifid or pinnate. *Flowers* sessile, cymose, sometimes polygamous or dioecious, bracteate. *Calyx*-tube adnate to the ovary; limb small, membranous, in fruit often enlarged or pappose. *Corolla* superior; tube equal or gibbous or spurred at the base; lobes 3–5, imbricate. *Stamens* 1–4, inserted on the corolla-tube, alternate with the lobes. *Ovary* 3-celled; cells 1-ovuled, or one 1-ovuled, the others imperfect; style filiform; stigmas 1–3, distinct or combined. *Fruit* dry, indehiscent, crowned with the limb of the calyx, 1-celled and 1-seeded. *Seed* pendulous; albumen 0 or scanty; embryo straight; cotyledons flat; radicle superior.

Valeriana, Linn.

Perennial herbs. *Leaves* entire pinnatifid or pinnate, the radical often long-petioled. *Flowers* in corymbosely panicled cymes; bracts small. *Calyx*-limb small, involute in flower, afterwards forming a deciduous pappus of many plumose bristles. *Corolla*-tube funnel-shaped, equal or gibbous at base; lobes 5, spreading, pink or white. *Stamens* 3. *Ovary* 3-celled, 1-ovuled; stigma shortly 2–3-fid or subentire. *Fruit* oblong, compressed, plano-convex, with 3 dorsal and 1 ventral rib, crowned with the plumose pappus.

Leaves simple or with sometimes one or two small leaflets below the end one, all entire or sometimes slightly sinuate on the margins, sparingly pubescent.. .... 1. **Leschenaultii.**

Leaves usually all pinnate:—

Radical leaves early deciduous, long-petioled, unequally **pinnate**, **cauline** with about 5–9 leaflets, the lowest pair alternate, the others **opposite**, all coarsely dentate, slightly acuminate, glabrous or **puberulous**.....2. **Arnottiana.**

Radical leaves persistent:—

Leaflets broad, ovate, usually crenate-dentate, softly **puberulous**, radical 1–5, the lowest pair often alternate, cauline 5–7.

3. **Hookeriana.**

Leaflets narrow, usually linear, the end one ovate, very many, opposite or the lower alternate, often with small intermediates to the larger ones, glabrous or softly puberulous, entire or few-dentate .....4. **Beddomei.**

1. VALERIANA LESCHENAULTII, DC.; F. B. I. 214; W. & A. 444; Wt. Ic. t. 1044. *V. Brunoniana*, W. & A. 443; Wt. Ic. t. 1043.

   Nilgiri Hills, above 6,000 ft., on the downs, but usually on the margins of Shola forests.

   A large perennial herb, the leaves quite simple in dry open places, slightly pinnate in moister ones. Flowers pink.

2. VALERIANA ARNOTTIANA, Wt. Ic. tt. 1045–6. *V. Hardwickii*, Wall., var. *Arnottiana*, C. B. Clarke; F. B. I. iii. 21[illegible]

   W. Ghâts, Nilgiri, Anamalai and Pulney Hills, at 5,000–7,000 ft.

   A tall-growing plant with thin, much-cut leaves and large panicles of white flowers.

3. VALERIANA HOOKERIANA, W. & A. 444; F. B. I. iii 214 Wt. Ill. t. 129.

   W. Ghâts. Nilgiri Hills, on the downs above 6,000 ft.

   A softly pubescent herb with white flowers.

4. VALERIANA BEDDOMEI, C. B. Clarke; F. B. I. iii. 214

   W. Ghâts, Anamalai and Pulney Hills about 7,000 ft.

   A well-marked herb with many narrow leaflets.

Family LXXXV. DIPSACACEAE.

Perennial herbs, rarely shrubs. *Leaves* opposite or whorled, sometimes connate at the base, entire toothed lobed or pinnate; stipules 0. *Flowers* in cymes whorls or dense heads, surrounded by bracts, bracteoles often conspicuous. *Calyx*-tube adnate to

the ovary, usually constricted above it; limb cup-shaped or bristly. *Corolla*-tube funnel-shaped; limb 2–5-fid, equal or 2-lipped, lobes imbricate in bud. *Stamens* 4 or 2, on the corolla-tube; anthers exserted, linear-oblong. *Ovary* 1-celled; ovule 1, pendulous; style filiform; stigma capitate linear or lateral; round the ovary an involucel, often adnate to it and persistent. *Fruit* a dry achene, enveloped in the involucel and surmounted by the calyx-limb. *Seed* pendulous, albuminous; embryo straight; radicle superior.

Dipsacus, Linn.

Stout erect herbs, prickly or bristly. *Leaves* opposite, toothed or pinnatifid. *Flowers* in long-peduncled terminal heads, surrounded by bracts; bracteoles rigid, on the receptacle. *Calyx*-limb cup-shaped, 4-lobed. *Corolla*-tube funnel-shaped; limb 4-lobed, equal or sub-bilabiate. *Stamens* 4. *Style* filiform; stigma oblique or lateral. *Achene* surrounded by the 8-ribbed involucel; cotyledons small, obtuse

DIPSACUS LESCHENAULTII, Coult.; F. B. I. iii. 268; Wt. Ill. 130; W. & A. 445.

W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft., on the downs.

A tall herbaceous plant with stout rootstock, villous pinnatifid leaves and white or yellowish flowers.

A specimen from Vantala in the Vizagapatam Hills, 4,500 ft., collected by A. W. Lushington, probably belongs to *D. inermis*. Wall.

Family LXXXVI. COMPOSITAE.

Herbs or shrubs, rarely trees. *Leaves* alternate or opposite, simple or compound; stipules 0. *Inflorescence* a centripetal head of many small flowers (less commonly few, rarely 1), sessile on the dilated top of the peduncle (receptacle), enclosed in an involucre of whorled bracts; bracteoles 0, or reduced to paleate scales or bristles on the receptacle. *Flowers* all tubular (discoid), or the outer or all ligulate (rayed); all ☿, or the inner ♂ or ♂, the outer ♀ or neuter, sometimes monoecious or dioecious. *Calyx*-tube adnate to the ovary; limb 0 or of hairs or scales (pappus). *Corolla* of two forms: (i) tubular or campanulate with

4–5-lobed limb, the lobes valvate; (ii) ligulate, the lobes connate in a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4–5, inserted within the corolla-tube; filaments usually free; anthers basifixed, usually connate. the connective produced upwards, the cells simple or tailed at the base. *Ovary* 1-celled; ovule solitary, erect, anatropous; style slender, normally 2-fid, the arms linear semi-terete, naked or pubescent, or tipped by pubescent cones, margins stigmatic. *Fruit* a dry indehiscent achene. *Seed* erect; testa membranous; albumen 0; cotyledons plano-convex; radicle short.

Series I. TUBULIFLORAE.—Flowers all tubular or the outer only ligulate. Juice usually watery:—

Tribe 1. VERNONIEAE.—Heads homogamous. Flowers all ♂, tubular, never yellow. Anthers cleft at the base, not tailed. Style-arms subulate, hairy. Pappus setose paleaceous or 0. Leaves usually alternate:—

Heads distinct, usually many-flowered:—

Pappus short, fugacious; outer bracts more or less leafy:—

Achenes 8–10-ribbed.....1. **Centratherum.**

Achenes not ribbed.....2. **Lamprachaenium.**

Pappus 0; achenes 10-ribbed; outer bracts not leafy 3. **Adenoon.**

Pappus long, copious, usually with an outer row of short bristles or paleae.....4. **Vernonia.**

Heads few-flowered, crowded in dense bracteate clusters 5. **Elephantopus.**

Tribe 2. EUPATORIEAE.—Heads homogamous. Flowers all ♂, tubular, rarely orange, never yellow. Anthers subentire at the base. Style arms obtuse, papillose. Pappus usually setose. Leaves opposite or alternate:—

Anthers truncate at apex; pappus usually of 3 clavate hairs 6. **Adenostemma.**

Anthers appendaged at apex; pappus usually of 5 paleaceous scales.....7. **Ageratum.**

Tribe 3. ASTEREAE.—Heads heterogamous, rayed or discoid or homogamous and rayless. Flowers of disk usually yellow, of ray variously coloured. Anthers subentire at the base. Style-arms flattened or plano-convex. Pappus usually thinly setose. Leaves usually alternate:—

Heads not rayed:—

Achenes 4-angled; pappus 0; corollas yellow.....8. **Centipeda.**

Achenes compressed, the margin thickened; pappus 0 or in ♂ of 2 or 3 minute hairs; corolla of ♀ reddish, of ♂ yellow
9. **Dichrocephala.**

Achenes minute, oblong, smooth; pappus 0; corollas rose-purple .....10. **Cyathocline.**

Achenes flattened, glandular; pappus tubular with fimbriate mouth; corollas yellow .....11. **Grangea.**

Heads rayed; disk flowers ♂, yellow:—

Ray flowers white:—

Pappus 0; achenes compressed, marginate; herbs
12. **Myriactis.**

Pappus copious; achenes angled or ribbed; shrubs
13. **Microglossa.**

Ray flowers white pink or purple, not yellow; pappus slender, often with a short outer ring; achenes compressed, marginate
14. **Erigeron.**

Ray flowers yellow, filiform; pappus slender, usually reddish in fruit; achenes compressed.....15. **Conyza.**

Tribe 4. INULEAE.—Heads heterogamous, rayed or discoid or homogamous and rayless. Flowers of disk and rays usually yellow. Anther-bases tailed (except *Laggera*). Style-arms linear obtuse or styles of sterile flowers undivided. Leaves alternate:—

Heads heterogamous, not rayed:—

Heads corymbose or panicled:—

Herbs, often aromatic, with narrow bracts; pappus 1-seriate, caducous:—

Anther-bases tailed.....16. **Blumea.**

Anther-bases not tailed .....17. **Laggera.**

Shrubs or undershrubs with broad bracts; pappus 1-seriate, free or sometimes connate.....18. **Pluchea.**

Erect or diffuse herbs; pappus 0 or of 2-3 caducous hairs
19. **Epaltes.**

Heads collected in dense globose or ovoid clusters:—

Herbs with decurrent leaves; bracts paleaceous, few or many; pappus 0.....20. **Sphaeranthus.**

Shrubs with broad leaves; bracts 1-2, short; pappus in sterile flowers 0, in fertile flowers of short unequal bristles
21. **Blepharispermum.**

Heads corymbose or fascicled; bracts scarious, usually hyaline; more or less white- or yellow-woolly everlastings:—

Flowers, ♂ usually sterile, ♀ in many rows fertile
22. **Anaphalis.**

Flowers. ♂ few fertile, ♀ in 2-many rows fertile
23. **Gnaphalium.**

Flowers, ♂ usually fertile, ♀ in 1, rarely 2 rows fertile
24. **Helichrysum.**

Heads solitary, terminal or axillary, drooping, large; outer bracts foliaceous; pappus 0 .....25. **Carpesium.**

Heads heterogamous, usually rayed:—

Achenes terete, villous; pappus of ray flowers scanty or 0, of disk flowers of few slender hairs..... 26. **Vicoa.**

Achenes usually ribbed; pappus double outer row of scales, inner of hairs.....27. **Pulicaria.**

Heads homogamous, not rayed, axillary, sessile with 2 large bracts; achenes flat, obovoid, winged; pappus of 2 ovate scales
28. **Caesulia.**

Tribe 5. HELIANTHEAE.—Heads heterogamous, usually rayed or homogamous, not rayed. Flowers usually yellow. Receptacle paleaceous. Anther-bases not tailed. Style-arms truncate or appendiculate, or of sterile flowers entire. Pappus of 2 4 bristles or paleaceous or 0. Leaves usually opposite:—

Heads monoecious; ♀ flowers all apetalous, ♂ many, in globular heads, the anthers free or nearly so; achenes 2 to each head, enclosed in a hardened spinous utricle; pappus 0; leaves alternate
29. **Xanthium.**

Heads heterogamous or homogamous; anthers united in a tube:—

Heads 1-flowered, in clusters on a common receptacle supported by bracteate leaves; bracts 4-5, connate; achenes cuneate, compressed or 3-angled: pappus a toothed or fimbriate cup; lower or all leaves opposite .....30. **Lagasca.**

Heads many-flowered:—

Flowers of ♀ ligulate, fertile, of ♂ sterile; leaves opposite:—

Herbs or undershrubs; achenes obovoid, compressed, usually keeled at the margins; pappus 0 or of 2 minute hairs ..... .31. **Moonia.**

Annual herbs; achenes spinous with 2 long horn-like spines at top .....**Acanthospermum.**

Flowers of ♀ fertile, of ♂ fertile or the innermost sterile:—

Pappus of 1-4 bristly awns or cup-like or 0:—

Achenes all thick, or those of ♀ flowers 3-cornered and those of ♂ flowers compressed:—

Inner bracts of involucre embracing the achenes of ♀ flowers, outer bracts 5, narrow, glandular; achenes glabrous, obovoid, angled; pappus 0 32. **Siegesbeckia.**

Inner bracts of involucre not embracing the achenes of ♀ flowers :—

Paleae of receptacle flat, slender, plumose ; outer bracts 5, broad, inner about 3 ; achenes of ♀ flowers triquetrous, warted, of ♀ flowers compressed ; pappus of 1-2 minute teeth ....33. **Eclipta.**

Paleae of receptacle concave, embracing the achenes :—

Ray flowers sterile, ligulate, yellow ; achenes obovoid, curved, enclosed in the rugose or ribbed, often beaked paleae ; pappus 0 or a ring of scales 34. **Sclerocarpus.**

Ray flowers fertile :—

Ligules small, yellowish or white ; achenes truncate, not ciliate, of ♀ flowers triquetrous or compressed, of ♀ flowers 3-4-angled ; pappus 0 or of 2-5 short bristles ..... 35. **Blainvillea.**

Ligules large, yellow ; achenes truncate, cuneate, not ciliate, smooth or tubercled ; pappus 0 or a ring of small scales ...36. **Wedelia.**

Ligules small, white or yellow ; achenes usually ciliate, of ♀ triquetrous or dorsally compressed, of ♀ laterally compressed ; pappus 0 or of 2-3 bristles .....37. **Spilanthes.**

Achenes more or less depressed from the top ; pappus of 2, rarely 3–4, bristles or 0 :—

Outer bracts of involucre foliaceous, inner passing into paleae ; ray flowers fertile :—

Achenes of ray flowers compressed, winged, the wings lacerate, of disk flowers compressed or triquetrous, often muricate ; pappus of 2 slender awns 38. **Synedrella.**

Achenes almost 4-cornered, glabrous, compressed, rounded at apex ; pappus 0 .....**Guizotia.**

Outer bracts of involucre few, small, inner connate below, membranous :—

Style-arms of disk flowers with a short appendage :—

Leaves alternate, pinnatisect ; ray flowers fertile ; achenes narrowly oblong, compressed, ciliate, bearded on the face ; pappus of 2 smooth stiff awns .... 39. **Glossocardia.**

Leaves opposite, simple to pinnatisect; **ray flowers** sterile; achenes linear or cuneiform; **pappus** of 2–4 persistent retrorsely barbellate awns
40. Bidens.

Style-arms of disk flowers with a long hairy appendage; ray flowers fertile: achenes compressed, linear, ovoid or almost winged, with 2 retrorsely barbellate awns ..... 41. **Glossogyne.**

Pappus of numerous scales; heads rayed; leaves opposite; receptacle paleaceous:—

Heads very small; ligules white; pappus of ray flowers 0, of disk flowers with fimbriate scales ...42. **Galinsoga.**

Heads medium-sized; ligules yellow; pappus of aristate feathery bristles ... .43. **Tridax.**

Tribe 6. HELENIEAE.—Heads heterogamous, rayed, or rarely homogamous, not rayed. Flowers usually yellow. **Receptacle** naked or slightly pitted. Anther-bases obtuse or rarely shortly sagittate, tips appendiculate. Style-arms truncate or appendiculate. Pappus paleaceous, aristate or 0. Leaves opposite or alternate:—

Heads very small, in dense cymes, surrounded by **floral leaves**; leaves opposite; achenes oblong, compressed, with 8–10 **prominent** ribs; pappus 0 .... **44. Flaveria.**

Tribe 7. ANTHEMIDEAE.—Heads heterogamous, **rayed or discoid** or homogamous and rayless. Flowers of various colours. **Receptacle** naked or paleaceous. Anther-bases not tailed. Style-arms **truncate.** Pappus 0 or a crown of short paleae. Flower-heads **discoid, hetero**gamous; pappus 0. Leaves usually alternate:—

Small herbs, often creeping; heads solitary, on long **peduncles**
45. **Cotula.**

Large herbs, usually erect and often shrubby; **heads very** small, in racemes or panicles ....46. **Artemisia.**

Tribe 8. SENECIONEAE.—Heads heterogamous, rayed or discoid, or homogamous, not rayed. Disk flowers yellow or **red**; ray flowers also usually yellow. Receptacle usually naked. **Anther bases** obtuse, rarely tailed. Leaves usually alternate:—

Style-arms truncate or appendiculate; pappus of **fine hairs**; heads homogamous, not rayed:—

Heads bracteolate at their bases; flowers yellow; **style-arms** with a long subulate hispid tip..... .....47. **Gynura.**

Heads without bracteoles at their bases; flowers **purple or red**; style-arms short and obtuse or long and acute.....**48. Emilia.**

Heads with or without bracteoles; flowers yellowish; style-arms short, papillose or hispid.....49. **Notonia.**

Heads heterogamous, rayed, rarely homogamous without rays; flowers usually yellow, bracteolate or not; style-arms usually truncate.....50. **Senecio.**

Tribe 9. CYNAREAE.—Heads homogamous or rarely heterogamous, with the outer ring of flowers neuter or ♀, all flowers tubular, variously coloured. Receptacle usually paleaceous or densely bristly. Anther-bases tailed. Styles subentire or the arms short, hairy and thickened towards the base. Pappus paleaceous or bristly, rarely 0. Leaves alternate, often spinous:—

Heads 1-flowered, crowded in involucrate spinous globose clusters 51. **Echinops.**

Heads many-flowered, separate:—

Basal areole of the achenes horizontal:—

Thistle with pinnatifid very spinous leaves; pappus hairs soft, feathery.....52. **Cnicus.**

Erect branched annual with the leaves not spinous; pappus paleaceous.....53. **Goniocaulon.**

Basal areole of the achenes oblique or lateral:—

Involucre without leafy outer bracts at the base of the heads:—

Involucral bracts aristate-acuminate, usually recurved; achenes smooth, obscurely ribbed, with curved and hollowed large basal areoles; pappus of stiff short paleaceous scales or 0.....54. **Tricholepis.**

Involucral bracts, inner acute, outer spinescent; achenes angled and ribbed, pitted between the ribs, the basal areole small and lateral; pappus of many unequal bristles, the 2-4 inner ones long, dilated and flattened.....55. **Volutarella.**

Involucre with spinous outer leafy bracts; achenes large, smooth, angled; pappus 0..... **Carthamus.**

Tribe 10. MUTISIEAE.—Heads heterogamous or homogamous, rayed or not. Involucral bracts many-seriate, unarmed or spinescent. Receptacle rarely paleaceous. Anther-bases tailed. Style arms rounded or truncate, not appendiculate. Pappus setose or paleaceous, rarely 0. Leaves usually alternate:—

Heads homogamous, with all the flowers ☿, or heterogamous with the outer flowers ♀; bracts rigid and spinescent; pappus hairs feathery; a low rigid white-tomentose undershrub.....56. **Dicoma.**

Series II. LIGULIFLORAE.—Flowers all ligulate. Juice milky:—

Tribe 11. CICHORIEAE.—Heads homogamous. Involucral bracts

membranous, usually 1–2-seriate. Receptacle **naked or paleaceous.** Anther-bases sagittate, rarely tailed. Style-arms **slender.** Pappus setose paleaceous or 0. Leaves radical or **alternate, never** opposite:—

Pappus hairs feathery; achenes transversely **barred between the** ribs:—

Receptacle flat, naked; hispid leafy herbs **with black hairs on** the bracts; achenes narrow, pointed at both **ends, not beaked**
57. Picris.

Receptacle paleaceous; glabrous scapigerous **herbs with unequal** bracts; achenes of two kinds, outer truncate, **inner long-beaked**
58. Hypochoeris.

Pappus hairs simple:—

Achenes usually beaked, narrowed at the ends:—

Achenes fusiform or oblong, often slender, **beaks short; corollas** usually yellow..... **59. Crepis.**

Achenes compressed or flattened, glabrous **or muriculate,** the beak ending in a circular disk; corollas pink **or bluish**
60. Lactuca.

Achenes angled and ribbed, long-beaked, **minutely spinous** below the beak; corollas yellow..... **Taraxacum.**

Achenes not beaked; pappus white, soft and **silky**:—

Achenes narrowed at the base, slightly **contracted and trun**cate at apex; tall herbs with large pinnatifid **leaves**
61. Sonchus.

Achenes **truncate** both at base and apex; **low herbs with** pinnatifid leaves and cylindric flower-heads.....**62. Launaea.**

1. Centratherum, Cass.

Erect or diffusely branched herbs. *Leaves* **alternate, petioled,** usually toothed. *Heads* homogamous, **pedunculate, solitary** or in corymbs. *Involucre* subhemispheric; **bracts many-seriate,** the outer herbaceous, often leafy, the inner **scarious.** *Receptacle* flat, naked or pitted. *Corollas* all tubular, equal, **slender, purple;** limb campanulate; lobes 5, narrow. *Anthers* **obtusely auricled.** *Style-arms* subulate, puberulous. *Achenes* **obtuse, 8–10-ribbed;** pappus scanty or copious, usually short, fugacious.

Pappus yellowish:—

Stout perennial; leaves rugose above, white **beneath, but promi**nently reticulate, the margins crenulate, recurved; **flower-heads**

large, over 1 in. in diam., the outer bracts ovate, leafy, scabridly hirsute ..... 1. *reticulatum.*

Annuals; leaves beneath white-tomentose:—

Flower-heads up to ·75 in. in diam., leaves more or less serrate, loosely white-felted, elliptic-ovate:—

Leaves deeply serrate; peduncles slender; outer bracts thickly white-felted, acute ..... 2. *molle.*

Leaves shortly serrate or entire; peduncles stout; outer bracts with coarse moniliform hairs, usually obtuse ... 3. *courtallensis.*

Flower-heads scarcely ·5 in. in diam.; leaves shortly crenulate, lanceolate, the under-surface closely felted except on the nerves; peduncles long, villous; outer bracts not white felted, but strigosely hirsute, acute ..... 4. *Rangacharii*

Pappus reddish:—

Slender herbs:—

Pappus long, red, as long as, or longer than the corolla, exsert; outer bracts herbaceous, broad, cordate at base; leaves elliptic-lanceolate, serrate, completely white-woolly beneath 5. *Ritchiei.*

Pappus short, pale, shorter than the corolla, included; outer bracts lanceolate, usually densely white-tomentose beneath, but rather variable; leaves elliptic, acute or acuminate, sharply serrate, white-tomentose beneath, but the nerves showing brown 6. *phyllolæum.*

Tall, stout herbs; inner pappus long, outer very short, rigid and paleaceous; outer bracts linear, green with purplish leafy obtuse tips; leaves long, lanceolate or ovate-lanceolate, coarsely serrate, membranous ..... 7. *anthelmiplicum.*

1. CENTRATHERUM RETICULATUM, Benth.; F. B. I. iii. 227. *Decaneuron reticulatum*, DC.; Wt. Ic. t. 1080 (not very good).

W. Ghâts, open downs in the Nilgiris, Anamalais and Pulneys above 6,000 ft., common and conspicuous.

A handsome plant 2–3 ft. high, with the appearance of a *Centaurea*.

2. CENTRATHERUM MOLLE, Benth.; F. B. I. iii. 227. *Decaneuron molle*, DC.; Wt. Ic. t. 1082.

W. Ghâts, hills of Tinnevelly and Travancore, apparently in damp places at low levels.

3. CENTRATHERUM COURTALLENSE, Benth.; F. B. I. iii. 227. *Decaneuron courtallense*, DC.; Wt. Ic. t. 1081.

W. Ghats, Anamalais and hills of Travancore and Tinnevelly at 5,000–7,000 ft.

4. CENTRATHERUM RANGACHARII, Gamble in Kew Bull. 1920, 338.
   Hills of Tinnevelly, apparently at 3,000–5,000 ft. (Rangachari, Barber).
5. CENTRATHERUM RITCHIEI, Hook. f.; F. B. I. iii. 228.
   W. Coast, in S. Canara (?) (Beddome).
   An annual herb with cordate outer bracts and long red pappus.
6. CENTRATHERUM PHYLLOLAENUM, Hook. f.; F. B. I. iii. 228.
   W. Ghâts, in S. Canara, Coorg, Mysore and Malabar at levels up to about 3,000 ft.
   A very variable annual herb; even the pappus is only sometimes reddish.
7. CENTRATHERUM ANTHELMINTICUM, O. Kze. Rev. Gen. i. 320. *Vernonia anthelmintica*, Willd.; F. B. I. iii. 236.
   All Districts, often on roadsides, frequent on black cotton soil.
   A large erect annual with purplish flowers. The seeds are used as an anthelmintic and to destroy insects. Vern *Hind.* Somraj.

2. Lamprachaenium, Benth.

An erect branched annual, hairs crisped. *Leaves* alternate, petioled, toothed, clothed below with white tomentum. *Heads* small, in subcorymbose panicles, homogamous. *Involucre* subcampanulate; bracts many-seriate, dry, the inner chaffy, acute, the outer with recurved foliaceous tips, the margins hispid. *Receptacle* flat, naked. *Corollas* all tubular, equal, slender; limb shortly 5-fid. *Anthers* obtusely auricled. *Style*-arms subulate. *Achenes* obovoid, slightly compressed, shining, glabrous; pappus hairs few, short, red, fugacious.

LAMPRACHAENIUM MICROCEPHALUM, Benth.; F. B. I. iii. 229.
Mysore, in the Bababudan Hills, at 4,000–5,000 ft. (Law, Meebold).
An erect herb 1–2 ft. high with loose inflorescence, the leaves white-felted beneath, the flowers purple.

3. Adenoon, Dalz.

An erect, rigid, scabrous herb. *Leaves* alternate, sessile, coarsely and irregularly serrate, rough. *Heads* moderate-sized, in corymbose panicles, homogamous. *Involucre* campanulate; bracts many-seriate, imbricate, oblong-lanceolate, aristate, the outer gradually shorter. *Receptacle* flat, minutely fimbriate. *Corollas* all tubular, equal, very slender; limb 5-cleft with long linear lobes. *Anthers* dark-coloured, sagittate. *Style-arms* subulate, hairy. *Achenes* obovoid-cylindric, 10-ribbed, glandular between the ribs; pappus 0.

ADENOON INDICUM, Dalz.; F. B. I. iii. 229.

W. Ghâts, in S. Canara and Coorg; Brumagiri Hills of Mysore (Fischer); hills of Tinnevelly (Beddome).

A rigid herb with broadly obovate serrate leaves and purple flowers.

4. Vernonia, Schreb.

Trees, shrubs, undershrubs, herbs or climbers. *Leaves* simple, alternate, entire or toothed. *Heads* homogamous, terminal or axillary, solitary or in cymes or panicles, usually corymbose. *I. olucre* ovoid, globose or hemispheric; bracts many-seriate, the inner the longest. *Receptacle* naked or pitted, sometimes shortly hairy. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anthers* obtusely auricled at base. *Style*-arms subulate, puberulous. *Achenes* 10-ribbed 3–5-angled or terete; pappus usually 2-seriate, the outer simple or paleaceous, the inner long, feathery.

Trees; achenes 10-ribbed:—

Heads 1-flowered; leaf-margin entire, or rarely serrate:—

Leaves oblanceolate, glabrous above, scabrid-pubescent beneath, 6–10 in. long, main nerves about 10–12 pairs, ·5–·6 in. apart on midrib, irregularly reticulate between; ribs of achene not prominent ..... 1. *Shevaroyensis.*

Leaves obovate, pubescent on nerves above, densely brown tomentose beneath, 4–8 in. long, main nerves 10–15 pairs, ·5–·75 in. apart on midrib, with more or less regular transverse nervules; ribs of achene very prominent, with few hairs and glands between them ..... 2. *Monosis.*

Heads 4–6-flowered; leaf-margin undulate, leaves obovate, obtuse,

glabrous on both sides, 2–6 in. long, main nerves about 8 pairs ; ribs of achene prominent with yellow glands between... 3. *travancorica.*

Shrubs or undershrubs :—

Achenes 10-ribbed, usually glandular between the ribs : —

Involucral bracts obtuse, mucronate :—

Leaves green beneath :—

Flower-heads small, slightly cottony, usually about 5-flowered, in small, short-peduncled corymbs at the ends of branches of a large panicle ; leaves elliptic, acute, narrowed at base, distantly serrate, scabrid above, pubescent beneath, main nerves few, distant ; pappus brownish.....4. *divergens.*

Flower-heads medium-sized, glabrous, usually 10 15-flowered in a large, usually long-peduncled terminal corymb ; leaves elliptic-lanceolate, acuminate, narrowed at base, closely sharply serrate, nearly glabrous on both surfaces, main nerves many, close and parallel ; pappus reddish

5. *pectiniformis.*

Flower-heads medium-sized, very white-cottony, 12-15-flowered, in short few-capitulate terminal corymbs ; leaves ovate, acute, narrowed at base, distantly shortly serrate, sparsely moniliform, hairy above, pubescent beneath, main nerves few, distant ; pappus white.....6. *pulneyensis.*

Flower-heads large, slightly puberulous, 30–40-flowered, in 1-3-capitulate corymbs ; leaves obovate or oblanceolate, obtuse and mucronate at apex, broadly amplexicaul and subauriculate at base, entire or nearly so, main nerves 2-3 pairs, indistinct ; pappus reddish.....7. *Meeboldii.*

Leaves white beneath :—

Flower-heads about 12-flowered, the bracts puberulous, in terminal corymbs about 5 in. in diam. ; leaves elliptic-lanceolate, up to 5 in. long, 3 in. broad, mucronate-serrate, glabrous above, closely appressed white-tomentose beneath, main nerves parallel, abont 10 pairs ; pappus reddish

8. *Heynii.*

Flower-heads about 15-flowered, the bracts glabrous, in terminal slenderly peduncled corymbs about 3·5 in. in diam., leaves lanceolate, acuminate at both ends, up to 4 in. long, 1·5 in broad, minutely serrate, glabrous above, closely appressed white-tomentose beneath, main nerves about 7–10 pairs ; pappus white.....9. *Fysoni.*

Flower-heads about 6–10-flowered, the bracts cottony-tomentose, in small corymbs in large terminal panicles or

broad corymbs up to about 8 in. in diam.; leaves broadly ovate or suborbicular, dentate, glabrous above, softly white-tomentose beneath, main nerves about 8 pairs, much raised beneath; pappus yellowish .....10. *indica.*

Involucral bracts sharply acuminate, often aristate, the lowest usually subulate:—

Flower-heads small, ·2–·3 in. broad, in panicles of corymbs, the outer involucral bracts only reflexed-aristate; leaves elliptic-lanceolate, scabrous, crenate-serrate, main nerves 7–8 pairs, irregular; pappus reddish.....11. *saligna* var. *nilghirensis.*

Flower-heads large, ·5 in. or more broad:—

Flower-heads in terminal corymbs, usually paniculate:—

Outer involucral bracts small, shortly aristate, reflexed, rest lanceolate; leaves oblanceolate or oblong-lanceolate, serrate, with scattered white hairs, up to 8 in. long, 2·5 in. broad, main nerves 7–11 pairs, distant; pappus pinkish; achenes long, hairy .....12. *Dalzelliana.*

Outer involucral bracts aristate, erect; leaves obovate, sharply serrate, scabrous, up to 5 in. long, 2 in. broad; main nerves regular, 8–10 pairs; pappus slightly reddish; branches straight.....13. *Roxburghii.*

Outer involucral bracts long-aristate, spreading; leaves elliptic-ovate or lanceolate, crenate, mucronate, rugose, reticulate, scabrous, up to 4 in. long, 2 in. broad, main nerves 6–7 pairs; pappus reddish; branches flexuous 14. *peninsularis.*

Flower-heads 1 in. or more in diam., single or 1–3 together, often 1 pedunculate, 1 nearly sessile at the ends of the long branchlets; leaves lanceolate or linear-lanceolate, caudate-acuminate, coarsely serrate; pappus white; achenes villous 15. *Beddomei.*

Achenes 3–5-angled:—

Outer pappus hairs setose, inner white, soft:—

Achenes 5-angled, silky, with white hairs; flower-heads ·25 in. in diam., in corymbose panicles about 3 in. in diam.; leaves sessile, spathulate, obtuse at apex, ashy pubescent, nearly entire, ·75–2 in. long .....16. *cinerascens.*

Achenes 4–5-angled, slightly hairy or glabrous, glandular; flower-heads ·3 in. in diam., in corymbose panicles often 5 in. in diam.; leaves petioled, ovate-lanceolate, acuminate, serrate, rough and pubescent beneath, up to 3 in. long, 1 in. broad 17. *setigera.*

Outer pappus hairs paleaceous:—

Leaves densely white-woolly beneath:—

Achenes trigonous:—

Heads very small, 5-flowered, ·1–·2 in. in diam., in close pedunculate corymbs, the involucral bracts short, cottony; achenes sharply angled, very glandular, the paleaceous scales fimbriate; leaves lanceolate, gradually narrowed above, minutely serrate, covered above (when young only) and below as well as on the branchlets with long, soft silky wool, up to 6 in. long, 1·5–2 in. broad...18. *gossypina.*

Heads rather large, about ·5 in. broad, about 15-flowered; the outer involucral bracts subulate, reflexed, inner obtuse, all white-cottony; achenes pyriform, glabrous, with strong ribs, the paleaceous scales fimbriate; pappus hairs stiff, few, deciduous; leaves linear-lanceolate, acute, crenulate, very rugose, covered below as well as the branches with closely-appressed white hairs, up to 6 in. long, 1 in. broad

19. *comorinensis.*

Achenes tetragonous:—

Heads small, 10–14-flowered, ·25 in. in diam., the involucral bracts short, oblong, acute, cottony; achenes glabrous, smooth-sided, the paleaceous scales narrow; leaves sessile, linear-lanceolate, obtuse, crenulate, very rugose, covered below as well as the branches with soft silky wool, up to 6 in. long, 1 in. broad .....20. *salvifolia.*

Heads many-flowered, ·5 in. in diam., the involucral bracts many, lanceolate acuminate, up to ·4 in. long, slightly araneous; achenes almost winged, glabrous; leaves lanceolate, petioled, acuminate, closely crenulate, villous above, covered below like the branches with white wool, up to 8 in. long, 2·5 in. broad .....21. *multibracteata.*

Leaves more or less tawny-pubescent or -tomentose beneath:—

Leaves beneath and branches with closely appressed golden pubescence, elliptic-lanceolate, acute, crenate-serrate, up to 3·5 in. long, 1·5 in. broad; flower-heads about ·4 in. broad, in nearly sessile terminal corymbs, the involucral bracts ovate mucronate; achenes 5-angled, [illegible] glandular, outer pappus very short .....22. *anamallica.*

Leaves beneath with soft tomentum:—

Tomentum thick, crispate, leaves elliptic or obovate, obtuse at apex, the margins subentire, up to 4·5 in. long, 2 in. broad; flower-heads small, 10-12-flowered, soft, in very

large terminal corymbose panicles, often 10 in. in diam. and long-peduncled; achenes 3–5- usually 4 angled, puberulous and glandular; outer pappus short, subulate

23. *Bourneana.*

Tomentum thin, leaves elliptic-lanceolate, acute at apex, serrulate, up to 4 in. long, 2 in. broad; flower-heads medium-sized, about 12-flowered, soft, in terminal corymbose panicles 4·5 in. in diam.; achenes 5-angled, glabrous, but with many white glands .....24. *malabarica.*

Tomentum thick, crispate; leaves oblanceolate, obtuse at apex; margins obscurely crenate, up to 2 in. long, ·5 in. in diam.; flower-heads usually 1–4 only, about ·5 in. in diam., many-flowered; achenes 4-angled, nearly glabrous but glandular .....25. *Bourdillonii.*

Leaves beneath only slightly pubescent when young, afterwards glabrous, linear-oblanceolate, subacute, obscurely serrate towards the apex, up to 2 in. long, 25 in. broad; flower-heads ·4 in. in diam., solitary or in pairs; achenes 4–5-angled, slightly pubescent and glandular; outer pappus fimbriate

26. *Ramaswamii.*

Herbs or herbaceous undershrubs with achenes smooth or slightly 4–5-angular only and covered with appressed silky hairs :—

Annual or somewhat perennial herbs erect or decumbent, ·5–1·5 ft. high, the leaves very variable, glabrous or pubescent, ovate or lanceolate, the margins undulately toothed; involucral bracts usually glabrous above; outer pappus hairs rather long

27. *cinerea.*

Annual or perennial undershrubs, herbaceous : –

Stems and leaves very white-tomentose, thick, leaves ovate-rhomboid, crenate-dentate; outer pappus hairs short

28. *albicans.*

Stems and leaves pubescent, thin, leaves often large, ovate-lanceolate, sharply serrate, prominently nerved; outer pappus hairs extremely short .....29. *conyzoides.*

1. **Vernonia shevaroyensis**, Gamble in Kew Bull. 1920, 341.

Carnatic, Shevaroy Hills of Salem (Perrottet).

A small tree with rather thin nearly glabrous leaves.

2. **Vernonia Monosis**, C. B. Clarke. *V. arborea*, var. *Wightiana*, Hook. f.; F. B. I. iii. 239. *Monosis Wightiana*, Wt. Ic. t. 1085; Bedd. Fl. t. 226.

W. Ghâts, from Coorg and the Bababudan Hills of Mysore

to the Nilgiris, Anamalais and the hills of Travancore, usually above 4,000 ft., common in Nilgiri Sholas.

A showy small tree with purple scented flowers and very tomentose leaves. Bark brown; wood pale brown, moderately hard, smooth and straight-grained. Vern. *Tam.* Shutthi; *Mal.* Kadavari.

3. VERNONIA TRAVANCORICA, Hook. f.; F. B. I. iii. 240. *V. volkameriaefolia*, Bedd. Fl. t. 225, *not of* DC.

W. Ghâts, hills of Travancore and Tinnevelly, in evergreen forests above 3,000 ft., often as standards over *Ochlandra* bamboo (Brandis).

A small tree reaching 30 ft. in height. Vern. *Tam.* Thenpu.

4. VERNONIA DIVERGENS, Edgew.; F. B. I. iii. 234. *V. nilgheryensis*, DC.; Wt. Ic. t. 1078. *Decaneurum divergens*, Wt. Ic. t. 1084.

E. Ghâts, hills from Ganjam to Godavari, up to 4,500 ft.; hill forests of the Deccan; W. Ghâts, common in dry forest areas up to 6,000 ft.

A tall handsome shrub reaching 4–5 ft., with pink flowers and small capitula, rather variable in hairiness according to climate.

5. VERNONIA PECTINIFORMIS, DC.; F. B. I. iii. 239; Wt. Ic. t. 1077.

W. Ghâts, Nilgiri Hills above 6,000 ft. on the margins of Sholas.

An erect or sometimes semiscandent shrub with purple flowers.

6. VERNONIA PULNEYENSIS, Gamble in Kew Bull. 1920, 341.

W. Ghâts, Kodaikanal in Pulney Hills at 7,000 ft. (Fyson).

A slender undershrub.

7. VERNONIA MEEBOLDII, W. W. Smith in Rec. Bot. Surv. Ind. iv. 283.

Travancore (Meebold)—from description only.

An erect undershrub.

8. VERNONIA HEYNII, Bedd. MS. in Herb. Madr. *ex* Gamble in Kew Bull. 1920, 340.

Hills of Travancore (Beddome).

Apparently an erect shrub.

9. VERNONIA FYSONI, Calder in Rec. Bot. Surv. Ind. vi. 343, t. 10.

Pulney Hills, in Shola Forest at about 6,000–7,000 ft. (Bourne, Fyson).

An erect undershrub, up to about 10 ft. high.

10. **Vernonia indica**, C. B. Clarke; F. B. I. iii. 238.

W. Ghâts, from S. Canara and Coorg southwards to the hills of Travancore at 4,000–6,000 ft.

A large erect undershrub, conspicuously white-tomentose on the branches, inflorescence and leaves beneath, the pappus yellowish, the flowers reddish-purple.

11. **Vernonia saligna**, DC.; F. B. I. iii. 235.

Var. *nilghirensis*, Hook. f.

W. Ghâts, Nilgiri Hills and Wynaad.

An erect undershrub.

12. **Vernonia Dalzelliana**, Drumm. & Hutch. in Kew Bull. 1909, 401.

W. Ghâts, S. Canara, Coorg and Mysore at 2,000–3,000 ft.

An erect or subscandent undershrub up to 4 ft. high, the rather large leaves membranous.

13. **Vernonia Roxburghii**, Less.; F. B. I. iii. 232.

N. Circars, Sal forests of Ganjam (Gamble).

A large erect scabrous undershrub with reddish flowers, the achenes with stiff hairs, the flower-heads large, many-flowered.

14. **Vernonia peninsularis**, C. B. Clarke; F. B. I. iii. 233. *Decaneuron silhetense*, DC.; Wt. Ic. t. 1083.

W. Ghâts, Anamalais, Pulneys and hills of Travancore, above 6,000 ft.

An erect undershrub with flexuous branches, reddish flowers and heads with recurved aristate lower bracts.

15. **Vernonia Beddomei**, Hook. f.; F. B. I. iii. 231

W. Ghâts, hills of S. Travancore at low elevations.

A straggling undershrub with long slender branches with distant leaves and large reddish-purple flowers.

16. **Vernonia cinerascens**, Schultz-Bip.; F. B. I. iii. 237.

S. Deccan, in dry plains regions of Coimbatore (Fischer).

An erect shrub, reaching 3 ft. in height.

17. **Vernonia setigera**, Arn.; F. B. I. iii. 235.

W. Ghâts, hills of Tinnevelly, about 4,000 ft.

An erect undershrub.

18. VERNONIA GOSSYPINA, Gamble in Kew Bull. 1920, 340.
Hills of Tinnevelly between Sengalteri and Naterikal, about 3,000–5,000 ft. (Rangachari).
A very handsome undershrub with pink corollas and beautiful long silky wool on the branchlets and undersides of the leaves.

19. VERNONIA COMORINENSIS, W. W. Smith in Rec. Bot. Surv. Ind. iv. 283.
Hills of Tinnevelly and Travancore about 3,000–5,000 ft. (Beddome, Rangachari).
A small tree (Beddome), but apparently a handsome shrub.

20. VERNONIA SALVIFOLIA, Wt. Ic. t. 1079; F. B. I. iii. 237.
Hills of Tinnevelly and Travancore at about 4,000–6,000 ft.
A handsome shrub with thick branches.

21. VERNONIA MULTIBRACTEATA, Gamble, in Kew Bull. 1920, 341.
Travancore Hills, at Peermerd, 3,000 ft. (Beddome).
Apparently a shrub.

22. VERNONIA ANAMALLICA, Bedd. in Herb. Madr. *ex* Gamble in Kew Bull. 1920, 339.
Anamalai Hills, in the higher ranges (Beddome).
Apparently an erect shrub, golden brown when dry.

23. VERNONIA BOURNEANA, W. W. Sm. in Rec. Bot. Surv Ind. vi. 101.
Pulney Hills and hills of Travancore, at 4,000–7,000 ft.
A shrub or undershrub.

24. VERNONIA MALABARICA, Hook. f.; F. B. I. iii. 230. *V. bababudensis*, Talbot in Journ. Bomb. Nat. Hist. Soc. xi. 237, t. 8. *V. Candolleana*, W. & A.; F. B. I. iii. 236 ?.
Bababudan Hills of Mysore at 5,000–6,000 ft. (Talbot); Sispara Ghát in Nilgiris (Beddome); hills of Travancore at 4,500 ft. (Meebold).
A stout shrub.

25. VERNONIA BOURDILLONII, Gamble in Kew Bull. 1920, 339.
Travancore, in grass lands at high elevations over 4,000 ft. (Bourdillon, Rama Row).
A common (Bourdillon) shrub reaching 3 ft. in height with purple flowers.

26. VERNONIA RAMASWAMII, Hutch. in Kew Bull. 1916, 35.
W. Ghâts, hills of Tinnevelly and Travancore, on the banks of streams and in the beds of rivers about 3,000–4,000 ft.
Apparently a small undershrub.

27. VERNONIA CINEREA, Less.; F. B. I. iii. 233 *in part.*
All plains Districts and to some altitude in the hills, a very common roadside or open forest or garden weed.
A herbaceous plant with pink or lilac flowers and white silky pappus, the involucral bracts oblong-lanceolate, acuminate, the leaves very variable.

28. VERNONIA ALBICANS, DC.; C. B. Clarke, Comp. Ind. 22. *V. cinerea*, Less., *in part*, F. B. I. iii. 233.
Hills of the Deccan, Carnatic and E. side of W. Ghâts, up to 4,000 ft. in open forest.
A very white tomentose undershrub.

29. VERNONIA CONYZOIDES, Wt. Ic. t. 1076, *except the achenes*; C. B. Clarke, Comp. Ind. 21. *V. cinerea*, Less.; F. B. I. iii. 233 *in part.*
W. Ghats, Nilgiris, Pulneys and southwards at high levels above 6,000 feet in Shola forests.
An erect herbaceous undershrub, sometimes reaching to 6 ft. in height, flowers purplish.

5. Elephantopus, Linn.

Rigid, usually perennial herbs. *Leaves* alternate or radical, entire or toothed. Heads homogamous, of 2–5 flowers, collected in a head-like cluster supported by 3 broadly ovate-cordate leafy bracts; bracts of the heads about 8, in 2 rows, the outer shorter, all stramineous, oblong, acute. *Receptacle* naked. *Corollas* equal, tubular; limb deeply cleft in 5 lobes, which often spread palmately. *Anthers* auricled at base. *Style*-arms subulate, puberulous. *Achenes* 10-ribbed, truncate at apex; pappus bristles rigid, slender throughout or dilated below in a chaffy base.

ELEPHANTOPUS SCABER, Linn.; F. B. I. iii. 242; Wt. Ic. t. 1086.
Forest undergrowth in all Districts, especially dry.
A stiff subscapigerous herb with obovate-oblong basal leaves up to 8 in. long, narrow sessile cauline ones, stiff

Heads with purple flowers and a pappus of 4–6 bristles dilated at base. Vern. *Hind.* Samdulun; *Tam.* Anashovadi.

6. Adenostemma, Forst.

Herbs, glabrous or glandular-pubescent and sticky. *Leaves* usually opposite, petiolate, variously toothed. *Heads* homogamous, in terminal corymbs. *Involucre* campanulate; bracts many, equal, in 2 rows, herbaceous, sometimes connate. *Receptacle* flat, pitted. *Corollas* all equal, tubular, regular; limb 5-toothed. *Anthers* truncate with a glandular tip and obtuse base. *Style*-arms large and long, clavate. *Achenes* compressed, truncate, 3–5-angled, papillose when young, afterwards often glabrous; pappus of 3 or more short clavate hairs on a short ring.

ADENOSTEMMA LAVENIA, O. Kze., Rev. Gen. i. 304. *A. viscosum*, Forst.; F. B. I. iii. 242. *A. latifolium*, DC.; Wt. Ic. t. 1087.

W. Coast and W. Ghâts, at all levels, in damp forests and along streams; Shevaroy Hills of Salem; forests of Cuddapah (Beddome).

An erect sticky herb reaching 3 ft. in height, with white flowers, trigonous achenes, 3 pappus hairs and very variable leaves, usually thin but sometimes rugose, usually broadly ovate, crenate serrate or dentate on the margins, in one form linear-oblong.

7. Ageratum, Linn.

Erect herbs or undershrubs, strong-scented. *Leaves* opposite or the upper alternate. *Heads* homogamous, in dense corymbs or panicles. *Involucre* campanulate; bracts 2–3-seriate, linear, subequal. *Receptacle* nearly flat, naked or with caducous scales. *Corollas* all tubular, equal, regular, 5-cleft. *Anthers* appendaged, bases obtuse. *Style*-arms elongate, obtuse. *Achenes* 5-angled, glabrous or the angles slightly hispid; pappus of 5 free or connate paleaceous scales, broad and lacerate towards the base, aristate at apex or of 10–20 narrow unequal scales.

AGERATUM CONYZOIDES, Linn.; F. B. I. iii. 243.

Most districts, both in the plains and hills, usually in damp

places and in forest undergrowth; abundant and often troublesome in tea, coffee and other plantations.

A softly hairy annual weed with pale blue flowers, ovate crenate petioled leaves and black achenes.

8. Centipeda, Lour.

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, heterogamous, not rayed, sessile on the branches or racemose, yellow; outer flowers ♀, many-seriate, inner ☿, fewer, all fertile. *Involucre* hemispheric, bracts 2-seriate, spreading in fruit, small. *Receptacle* flat, naked. *Corollas* of ♀ flowers minute, obscurely lobed, of ☿ flowers with short tube and campanulate limb, 4–5-lobed. *Anther*-bases obtuse. *Style*-arms short, truncate. *Achenes* 4-angled, obtuse at tip, the angles hairy, often glandular between; pappus 0.

CENTIPEDA ORBICULARIS, Lour.; F. B. I. iii. 317. *Dichrocephala Schmidii*, Wt. Ic t. 1610.

All Districts, in wet places.

A diffuse often prostrate small herb having obovate leaves with few teeth, the flower-heads sessile.

9. Dichrocephala, DC.

Annual herbs. *Leaves* alternate, lyrate or pinnatifid, toothed. *Heads* heterogamous, not rayed, very small, globose or hemispheric, in terminal or axillary panicles; outer flowers ♀, fertile, many-seriate, inner ☿, fertile, fewer. *Involucre* small; bracts sub-biseriate, slightly unequal. *Receptacle* somewhat contracted within the margin, elevated, the top flat. *Corollas* short: of ♀ flowers slender, minutely 2–3-toothed or expanded in a 3–4-lobed limb, reddish; of ☿ flowers with a campanulate 3–4-lobed limb, yellow. *Anthers* short, the bases truncate. *Style*-arms short, flattened. *Achenes* compressed, with a thickened margin; pappus 0 or in ☿ flowers of 2–3 minute hairs.

Heads ·1 in. in diam.; corolla of ♀ flowers narrowly tubular, curved, scarcely toothed; leaves petioled, very variable, usually obovate in outline, pinnatifid, with a large terminal lobe and smaller lateral ones, crenate-serrate, up to 5 in. long, 2 in. wide, sparsely hairy.....1. *latifolia*.

Heads ·2 in. in diam.; corolla ♀ flowers shortly tubular below, expanding above with 3-4 lobes leaves sessile, auricled at base, obovate or oblong, pinnatifid cal ely ser a te, up to about 2 in. long, ·5 in. wide, hispid-pubescent.....2. *chrysanthemifolia.*

1. DICHROCEPHALA LATIFOLIA. *DC.*; *F. B. I.* iii. 245; Wt. Ic. t. 1096.

   N. Circars, Hills of Vizagapatam abov 3000 ft.; Deccan. in N. Coimbatore Hills; W. Ghâts, in all Districts and to 8,000 ft.

2. DICHROCEPHALA CHRYSANTHEMIFOLIA, D.C. F.B.I iii 245; Wt. Ic. t. 1095.

   W. Ghâts, Nilgiri and Pulney Hills, above 6,000ft., on open downs.

10. Cyathocline, Cass.

Erect, annual scented herbs. *Leaves* alternate, pinnatisect, *Heads* heterogamous, small, in terminal panicles, not rayed; outer flowers ♀, fertile, many-seriate; inner ♀, usually sterile. *Involucre* hemispheric; bracts sub-biseriate, lanceolate, acute, with scarious margins. *Receptacle* elevated, with contracted base and naked concave top. *Corollas* of ♀ flowers filiform with 2-toothed limb; of ♀ tubular with campanulate 5-lobed limb. *Anthers* appendaged at tip, bases truncate. *Style*-arms exserted, short, in ♀ flowers sometimes simple. *Achenes* minute, oblong, smooth; pappus 0.

CYATHOCLINE LYRATA, Cass.; F. B. I. iii. 246; Wt. Ic. t. 1098.

Hills of N. Circars and Deccan, in moist places and on banks of streams; W. Ghâts, down to Nilgiris, at low levels, in wet places and ricefields.

A very pretty sweet-scented herb with rose-purple flowers and very much cut leaves.

11. Grangea, Forsk.

Herbs, suberect or prostrate, villous. *Leaves* alternate, pinnatifid, *Heads* heterogamous, not rayed, terminal or leaf-opposed, subglobose; outer flowers ♀, fertile, 1-or many-seriate; inner ♀, fertile. *Involucre* broadly campanulate; bracts few-seriate, the outer herbaceous. *Receptacle* convex or conical, naked. *Corollas* of ♀ flowers filiform, the outer 2-, the inner 2–4-cleft; of ♀ flowers with slender tube and campanulate 4–5-lobed limb. *Anthers*

produced at apex, obtuse at base. Style-arms in ♀ short, in ♂ flattened, obtuse or with triangular points. *Achenes* flattened, glandular; pappus tubular with a fimbriate mouth.

GRANGEA MADERASPATANA, Poir.; F. B. I. iii. 247; Wt. Ic. t. 1097.

All plains Districts. A common weed usually growing prostrate on the ground on sandy lands and in waste places.

Flowers yellow, leaves sinuately pinnatifid with opposite lobes, the pappus-tube characteristic.

12. Myriactis, Less.

Erect annual herbs. *Leaves* alternate, dentate. *Heads* heterogamous, rayed, the ray flowers white, those of the disk yellow, solitary or in loose panicles; outer flowers ♀, fertile, 2- many-seriate; disk flowers ♂, often sterile. *Involucre* hemispheric; bracts few-seriate, narrow, the margins scarious. *Receptacle* broad, convex, naked. *Corollas* of ♀ flowers with short tube, the ligule spreading or revolute in a curl, those of ♂ flowers with a short tube and campanulate 4–5-lobed limb. *Anthers* obtuse at base. *Style*-arms of ♀ short, of ♂ lanceolate, flattened. *Achenes* compressed, marginate, shortly beaked; pappus 0.

MYRIACTIS WIGHTII, DC.; F. B. I. iii. 247; Wt. Ic. t. 1091.

W. Ghâts, Nilgiris and Pulney Hills at 7,000 ft. and higher. A stiff, annual weed with ovate or lyrate dentate villous leaves decurrent on a rather long petiole, long-peduncled heads and white-rayed flowers.

Var. *bellidioides*, Hook. f., leaves mostly radical, spathulate; heads scape-like, solitary.

Nilgiris, above Sispara, at 6,000–7,000 ft.

13. Microglossa, DC.

Shrubs, sometimes climbing. *Leaves* alternate, entire or denticulate-serrate, petioled. *Heads* heterogamous, rayed, in corymbs often paniculate; ray flowers ♀, in 1-many-rows, fertile; disk flowers ♂, few or many, often sterile. *Involucre* campanulate; bracts narrow, the margins usually scarious, the outer short. *Receptacle* flat, naked or slightly fimbrillate. *Corollas* of ligulate flowers with narrow tube and bifid whitish ligule; of disk flowers tubular with campanulate limb and 5 spreading lobes.

Anther-bases obtuse. *Style*-arms in ♀ slender, in ☿ lanceolate, flattened. *Achenes* angular or ribbed, hairy, more or less compressed; pappus hairs 1-2-seriate, rather unequal.

MICROGLOSSA ZEYLANICA, Benth.; F. B. I. iii. 257.

W. Ghâts, Pulney Hills (Wight).

An erect branching shrub.

Var. *Beddomei*, Gamble. Leaves sessile or nearly so, narrower and more prominently nerved, broadest near the base; flowers, both ♀ and ☿, more numerous.

W. Ghâts, hills of Travancore (Beddome); Sengalteri in Tinnevelly (Madras Coll.)

14. Erigeron, Linn.

Annual or perennial herbs. *Leaves* alternate, usually radical and cauline, entire or toothed. *Heads* heterogamous, rayed, the outer ligulate flowers in few series ♀, then usually many filiform ♀ without ligules; disk flowers ☿, all usually fertile. *Involucre* hemispheric or campanulate; bracts sub-biseriate, narrow, numerous. *Receptacle* flat or slightly convex, naked or pitted. *Corollas* of ligulate flowers narrow, white, pink or purple, of interior ♀ flowers merely filiform, of ☿ flowers yellow, tubular, with campanulate 5-lobed limb. *Anther*-bases obtuse. *Style*-arms of ♀ flowers linear, of ☿ flowers lanceolate, flattened. *Achenes* compressed, marginate, narrow, usually minutely villous; pappus slender, feathery, often with a short outer ring.

Heads very small, under ·25 in. in diam., in elongate branched many-flowered panicles; leaves narrowly linear or lanceolate, entire or slightly toothed ..... 1. *canadensis*.

Heads more than ·25 in. in diam., in few-flowered terminal corymbs:—

Leaves obovate, coarsely toothed, amplexicaul at base, softly villous pappus white ..... 2. *asteroides*.

Leaves oblong-lanceolate, entire or slightly toothed, the radical spathulate, decurrent on a long petiole; pappus reddish 3. *alpinus* var. *Wightii*.

1. ERIGERON CANADENSIS, Linn.; F. B. I. iii. 254.

W. Ghâts, Nilgiris, at 6,000 ft., believed to have spread from N. America.

A tall herb, reaching 3 ft. in height, the small ligules pale rose-coloured.

2. **Erigeron asteroides**, Roxb.; F. B. I. iii. 254.

Plains Districts of the Circars, Deccan and Carnatic, less **common** on W. Coast, up to about 3,000 ft.

A coarse villous herb with bluish ligules and yellow disk **flowers**, the pappus a dirty white.

3. **Erigeron alpinus**, Linn.; F. B. I. iii. 255.

Var. ***Wightii***, Hook. f.. *E. Wightii*, DC.; Wt. Ic. t. 1090.

W. Ghâts, Nilgiris, above 6,000 ft., on the downs.

An erect hispid herb **with** pale purple ligules, the disk **flowers** yellow.

E. mucronatus, DC., a Mexican plant, is cultivated and has run **wild in the** Nilgiri Hills, where it has been known locally as ***Vittadenia australis***, A. Rich. (*cf.* Fyson Hillt. Fl. 223).

15. Conyza, Less.

Annual or perennial herbs. *Leaves* alternate, entire or variously lobed. ***Heads*** heterogamous, not rayed, in corymbs or panicles, **rarely solitary**, the outer flowers ♀, many-seriate, fertile, inner ♀, **fertile or sterile.** *Involucre* campanulate; bracts 2-many-seriate, **narrow, the outermost smallest.** *Receptacle* flat or convex, naked or **pitted and fimbriate.** *Corollas* of ♀ flowers filiform, short, **yellow, of ♀ flowers** tubular, with slightly enlarged 5-lobed limb, **yellow.** *Anther*-bases obtuse. *Style*-arms of ♀ slender, of ♀ **flattened, lanceolate.** *Achenes* small, compressed; pappus slender, 1- or **rarely 2-seriate**, usually reddish in fruit.

Flower-heads rather large, ·25 in. or more broad:—

Heads in corymbs:—

Corymbs terminal or from upper axils, close:—

Leaves obovate or oblong, radical spathulate, coarsely but **regularly** serrate; heads ·3 in. broad; achenes with few **scattered** hairs or glabrous ....1. *japonica.*

Leaves lanceolate or obovate-lanceolate, irregularly and **pinnatifidly** lobed; heads ·5 in. broad; achenes villous 2. *aegyptiaca.*

Corymbs terminal on most branchlets, loose; leaves lanceolate, **entire or serrate**, narrowed at both ends, viscid; heads ·3 in. **broad; achenes** minutely villous ....3. *viscidula.*

Heads in racemose panicles, usually loose, about ·4 in. broad; **leaves long**, linear, entire or sometimes remotely serrate, hispidly villous; achenes sparsely silky ....4. *ambigua.*

Flower-heads very small, about ·1 in. broad, in rounded terminal corymbs; leaves narrowly linear to obovate-spathulate, entire or serrate, crispate-pubescent, fastigiately arranged on the stems; achenes puberulous .....5. *stricta.*

1. CONYZA JAPONICA, Less.; F. B. I. iii. 238.
   N. Circars, Mahendragiri Hill at 4,000 ft.; W. Ghâts, Nilgiri and Pulney Hills, above 5,000 ft.
2. CONYZA AEGYPTIACA, Ait.; F. B. I. iii. 258.
   Deccan, in Mysore and Coimbatore to the N. slopes of the Nilgiris at 5,000 ft., in dry places.
3. CONYZA VISCIDULA, Wall.; F. B. I. iii. 258.
   W. Ghâts, on western side from Wynaad to Tinnevelly, at 3,000–4,000 ft.
   A tall much-branched viscid herb.
4. CONYZA AMBIGUA, DC. Fl. Fr. vi. 468. *Erigeron linifolius*, Willd.; F. B. I. iii. 234.
   Deccan, in N. Arcot (Rangachari); W. Ghâts, Nilgiri and Pulney Hills, often on roadsides, above 6,000 ft.
   An erect soft villous herb with yellow flowers, said (in F. B. I.) to be an "escape," *i. e.* an introduced plant.
5. CONYZA STRICTA, Willd.; F. B. I. iii. 258.
   N. Circars, Mahendragiri Hill, at 4,500 ft.; hills of the Deccan and Carnatic; W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 4,000 ft.
   An erect plant with very small yellowish flower-heads.

16. Blumea, DC.

Herbs or undershrubs, occasionally shrubs, annual or perennial, glandular-pubescent, woolly or glabrous, usually aromatic. *Leaves* alternate, usually toothed or lobed. *Heads* heterogamous, not rayed, in corymbs panicles or fascicles, rarely racemed or solitary, the outer flowers ♀, many-seriate, the inner ♀♂, few, fertile. *Involucre* campanulate; bracts many-seriate, narrow, herbaceous or soft, the outer smaller. *Receptacle* flat, naked, sometimes pubescent. *Corollas* of ♀ flowers filiform, minutely 2-3-toothed; of ♀♂ flowers tubular, slender, with a slightly enlarged 5-lobed limb. *Anther*-bases sagittate with small slender tails. *Style*-arms of ♀ slender, of ♀♂ flattened, papillose. *Achenes* small, terete or angled or ribbed; pappus 1-seriate, the hairs slender, caducous.

Herbs. Heads solitary or 2, peduncled at the ends of the branchlets; lobes of ♂ corollas villous :—

Inner involucral bracts long-hair-tipped; leaves all alternate, semi-amplexicaul, dentate or entire; achenes oblong, not angled or ribbed, pubescent; pappus pink.....1. *amplectens.*

Inner involucral bracts acuminate, not long-hair-tipped; leaves alternate, but the 2 uppermost subopposite, sessile but not amplexicaul, serrate; achenes oblong, angled, pubescent; pappus white.....2. *bifoliata.*

Heads few, in axillary and terminal corymbs :—

Prostrate herb with branches radiating from the rootstock; leaves membranous, obovate, sharply dentate, the young ones silky; corolla-lobes of ♂ flowers villous; achenes 4-angled

3. *oxyodonta.*

Erect herbs :—

Heads ·3 in. broad or less, long-peduncled; leaves membranous, sessile or nearly so, sharply dentate, the teeth alternately long and short, the young ones silky; corolla-lobes of ♂ flowers pubescent; achenes angled, sparsely hairy.....4. *eriantha.*

Heads ·3 in. broad, sessile; leaves rather thick, ovate or obovate, densely white-silky beneath, irregularly dentate; corolla-lobes of ♂ flowers pubescent in bud, afterwards glabrous; achenes terete, nearly glabrous.....5. *Belangeriana.*

Heads ·5 in. or more broad, densely silky, peduncled; leaves leathery, sessile, obovate, closely jaggedly dentate, densely white-silky on both sides; corolla-lobes silky pubescent, also tube; achenes flattened, hairy.....6. *Malcolmii.*

Heads many :—

Heads in close spiciform cymes or panicles, usually small :—

Corollas of ♂ purple; leaves obovate :—

Leaves irregularly toothed; corolla-lobes glandular; achenes hairy.....7. *Wightiana.*

Leaves regularly gland-toothed; corolla-lobes glabrous or slightly hairy; achenes glabrous or nearly so

8. *neilgherrensis.*

Corollas of ♂ yellow :—

Heads sessile in distinct fascicles on long nearly leafless spikes; involucral bracts usually red or purple; corolla-lobes slightly hairy; leaves oblanceolate, coarsely toothed, sometimes pinnatifid; achenes 4-angled and ribbed, sparsely hairy

9. *glomerata.*

Heads in peduncled clusters both terminal and axillary :—

Leaves small, 1–2 in. long, densely white-silky beneath, obovate or oblanceolate, coarsely toothed; heads with slender peduncles; corolla-lobes glandular; achenes ribbed, hairy .....10. *barbata.*

Leaves large, up to ·5 in. long, not silky and nearly glabrous beneath, obovate or lyrate, coarsely toothed, with rather few sharp teeth; corolla-lobes glabrous; achenes not ribbed, subtetragonous.....11. *lacera.*

Heads in close clusters terminal to the stem or its branches, the stem scape-like, the clusters with much silky wool underneath them; basal leaves in rosette, oblanceolate or spathulate, regularly shortly dentate, stem-leaves usually smaller and more oblong, often very white-woolly; corolla-lobes glabrous but glandular; achenes ribbed, pubescent at first, then glabrous.....12. *hieracifolia.*

Heads small, in spreading corymbs and panicles; corollas of ♂ yellow; achenes ribbed:—

Lower leaves runcinate lyrate or subpinnatifid:—

Stem tall, slender, much branched, glabrous, as are the leaves; lower leaves lyrate or runcinate, irregularly toothed, upper oblong, all membranous and green; heads small, on slender peduncles; corolla-lobes glandular; receptacle glabrous 13. *virens.*

Stem and leaves pubescent or villous:—

Receptacle glabrous; heads in open panicles; leaves obovate or oblanceolate, coarsely toothed, the upper small, minutely pubescent.....14. *membranacea.*

Receptacle minutely pubescent; heads in corymbs often congested; leaves variable, obovate spathulate, often very pinnatifid, villous .....15. *laciniata.*

Lower leaves obovate or oblanceolate, irregularly toothed, decurrent; heads in much divaricating branched corymbs, the peduncles glandular; achenes very silky-pubescent 16. *Jacquemontii.*

Heads large:—

Tall herbs, with heads in axillary sessile or peduncled clusters; leaves lanceolate-oblong distantly serrate, subsessile; receptacle pubescent; achenes ribbed .....17. *malabarica.*

Stout herbs with heads in clusters at the ends of the many branches; leaves elliptic-lanceolate, acuminate, irregularly toothed; achenes angled and ribbed .....18. *flexuosa.*

Shrub or undershrub reaching 6 ft. high, the heads in a large

pyramidal panicle; leaves lanceolate or oblanceolate, 6–10 in. long, shortly serrate, long petioled; achenes ribbed, softly hairy
19. *spectabilis*.

1 BLUMEA AMPLECTENS, DC.; F. B. I. iii. 260
Deccan and Carnatic, in dry Districts, frequent near the sea on the E. coast.
A small annual herb with yellow flowers, the coast form often glabrous.

2. BLUMEA BIFOLIATA, DC.; F. B. I. iii. 261.
N. Circars, Deccan and Carnatic, in dry places.
A bushy herb up to 2 ft. high with yellow flowers.

3. BLUMEA OXYODONTA, DC.; F. B. I. iii. 266.
Most Districts, not very common.
A prostrate herb with large basal leaves and long branches with small ones.

4. BLUMEA ERIANTHA, DC.; F. B. I. iii. 266.
Locality not recorded, probably W. Coast (Wight).
A slender erect herb with peduncled heads in dichotomous corymbose cymes.

5. BLUMEA BELANGERIANA, DC.; F. B. I. iii. 266.
W. Ghâts, in all Districts from S. Canara southwards, up to about 3,000 ft.
An erect herb with reddish-brown stems and silky flowers and leaves, the heads sessile in the leaf-axils.

6. BLUMEA MALCOLMII, Hook. f.; F. B. I. iii. 266.
Locality not recorded, probably S. Canara and Malabar (Wight).
A stout herb with rather large thick leaves, which, with the inflorescence, are covered with soft white silky wool, the flowers yellow.

7. BLUMEA WIGHTIANA, DC.; F. B. I. iii. 261.
All Districts and up to 4,000 ft. in hilly country, common.
An erect strong-smelling herb.

8. BLUMEA NEILGHERRENSIS, Hook. f.; F. B. I. iii. 261.
W. Ghâts, Nilgiri and Pulney Hills, southwards to those of Tinnevelly, above 5,000 ft.
An erect herb, very softly hairy.

9. BLUMEA GLOMERATA, DC.; F. B. I. iii. 262.
N. Circars, in the undergrowth of Sal forests in Gan-

jam; Deccan, Nallamalai forests of Kurnool, hills of Mysore.

An erect distinct-looking herb with reddish bracts.

10. BLUMEA BARBATA, DC.; F. B. I. iii. 262.

W. Ghâts, Pulney Hills and hills of Travancore and Tinnevelly, at low elevation.

A slender silky herb, resembling *B. eriantha*, flowers yellow.

11. BLUMEA LACERA, DC.; F. B. I. iii. 263.

Var. *glandulosa*, Hook. f. More or less glandular, the leaves short and little-toothed, the flowers in heads on the many branchlets.

Nearly all Districts, but especially Western ones, usually at low elevations.

A large strong-smelling herb, with thin, very variable leaves and yellow flowers.

12. BLUMEA HIERACIFOLIA, DC.; F. B. I. iii. 263; Wt. Ic. t. 1099.

W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft., in wet places and on the banks of streams.

A simple or sparingly branched, usually scapigerous herb with one close terminal cluster of heads and small stem leaves, flowers yellow.

Var. *macrostachya*, Hook. f. A taller, stronger herb with simple or branched inflorescence, larger flowers and leaves, especially on the stem, and usually with much white silky wool.

N. Circars, hills of Vizagapatam at 5,000 ft. (A. W. Lushington); W. Ghâts, Nilgiri and Pulney Hills and hills of Tinnevelly above 6,000 ft., most common in the Pulneys.

13. BLUMEA VIRENS, DC.; F. B. I. iii. 264.

N. Circars, Deccan and W. Ghâts in hilly forest country and up to 5,000 ft.

A tall slender glabrous herb with yellow flowers. The var. *minor*, Hook. f., is clearly only a dwarf form.

14. BLUMEA MEMBRANACEA, DC.; F. B. I. iii. 265.

N. Circars and Deccan in forest country, E. slopes of W Ghâts at low elevation.

Var. *gracilis*, Hcok. f. Heads quite small, the [illegible] racemose.

W. Coast, in Malabar (?)

Var. *Gardneri*, Hook. f. Heads large, on large terminal corymbose branches.

W. Ghâts, Nilgiri and Pulney Hills above 5,000 ft.

15. BLUMEA LACINIATA, DC.; F. B. I. iii. 264.

N. Circars, forest parts of Ganjam (Gamble).

A stout villous herb.

16. BLUMEA JACQUEMONTII, Hook. f.; F. B. I. iii. 265.

E. Ghâts, Mahendragiri in Ganjam at 4,500 ft. (Gamble, Fischer and Gage), Rumpa Hills in Godavari (Gamble); W. Ghâts, at Coonoor, Nilgiris, 5,000 ft. (C. B. Clarke).

A coarse glandular herb with yellow flowers and stiff, coloured, involucral bracts.

17. BLUMEA MALABARICA, Hook. f.; F. B. I. iii. 267.

W. Coast, in S. Canara and Malabar; W. Ghâts, Bababudan Hills of Mysore at 3,500 ft.

A tall erect plant with narrow leaves.

18. BLUMEA FLEXUOSA, C. B. Clarke; F. B. I. iii. 267.

W. Ghâts, hills of Mysore at 3,500 ft., Sispara in Nilgiris about 6,000 ft., hills of Travancore at 6,000 ft.

A tall plant with large soft spreading inflorescence.

19. BLUMEA SPECTABILIS, DC.; F. B. I. iii. 269.

W. Ghâts, in all Districts though scarce, up to 2,000 ft. in the Bolumpatti Valley, Coimbatore and the Attapadi Valley of Malabar (Fischer).

A tall shrubby species with yellow flowers, the pappus red or white.

17. Laggera, Sch.-Bip.

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent in a wing to the stem. *Heads* heterogamous, not rayed, panicled or axillary, the outer flowers ♀, many-seriate, the inner ♀♂, many, fertile. *Involucre* campanulate; bracts many-seriate, narrow, often rigid, the outer shorter. *Receptacle* flat, naked. *Corollas* of ♀ flowers filiform, the mouth minutely toothed; of ♀♂ flowers tubular, limb 5-lobed. *Anther*-bases 2-lobed or sagittate, not tailed. *Style*-arms of ♀ slender, of ♀♂ slightly flattened. *Achenes* small, subterete, angled or ribbed; pappus 1-seriate, the hairs slender, often caducous.

Flowers yellow; stems slender, not winged; leaves cordate and

semi-amplexical at base, ovate-oblong, coarsely-toothed, glabrous; achenes minute, pale, angled, smooth ..... 1. *flava.*
Flowers purplish or pink; stems thick, more or less winged; leaves decurrent on the stem at their base:—
Leafy wings of the stout stem entire and continuous, the leaves oblong, obtuse or slightly acute, denticulate; heads in short racemes on short peduncles; anther-bases sagittate; achenes oblong, dark, faintly ribbed and silky-villous. .....2. *alata.*
Leafy wings of the slender stem deeply lobed, often discontinuous, the leaves oblanceolate, acute, serrate; heads on slender peduncles at the ends of the branches; anther-bases obtuse; achenes narrow, dark, faintly ribbed and puberulous.....3. *pterodonta.*
Leaves shortly or not decurrent in wings on the stem, oblanceolate, deeply cut or pinnatifid, auricled at base; heads in terminal panicles of corymbs, long-peduncled; anther-bases sagittate; achenes dark red, somewhat flattened, obscurely ribbed
4. *aurita.*

1. LAGGERA FLAVA, Benth.; F. B. I. iii. 270.
N. Circars, in the forests of Ganjam and Vizagapatam, especially under Sál; W. Ghâts, Travancore Hills up to 3,500 ft. (Beddome).
A rather conspicuous herb from its bright yellow flowers in loose-panicled cymes, and rather large glabrous leaves.
2. LAGGERA ALATA, Sch.-Bip.; F. B. I. iii. 271. *Blumea alata*, DC.; Wt. Ic. t. 1101.
N. Circars, Mahendragiri Hill in Ganjam at 4,500 ft. (Gamble); hills of the Deccan and Carnatic; W. Ghâts, Mysore hills, Nilgiris, Pulneys and hills of Tinnevelly, up to 7,000 ft.
A stout rough leafy herb with conspicuously winged stems and drooping flowers. Fyson says the young leaves smell like Black-currants.
3. LAGGERA PTERODONTA, Benth.; F. B. I. iii. 271. *Blumea pterodonta*, DC.; Wt. Ic. t. 1100.
N. Circars, in Ganjam (Barber); Deccan, hills of Cuddapah (Beddome); W. Ghâts, Nilgiri and Pulney Hills at about 3,000–5,000 ft.
A more slender herb nearly glabrous.
4. LAGGERA AURITA, Sch.-Bip.; F. B. I. iii. 271.
All dry Districts, especially on the E. Coast.

A slender viscidly pubescent herb, said to smell of turpentine.

18. Pluchea, Cass.

Shrubs or undershrubs, rarely herbs, tomentose or glutinous. *Leaves* alternate. *Heads* heterogamous, not rayed, white yellow or lilac, small in terminal corymbs or large and subsolitary, the outer flowers ♀, many-seriate, fertile, the inner ♀♂ few, sterile. *Involucre* ovoid or campanulate; bracts ovate or lanceolate, usually broad, dry, rigid. *Receptacle* flat, naked. *Corollas* of ♀ flowers filiform, minutely toothed; of ♀♂ flowers tubular with a slightly enlarged 5-lobed limb. *Anther*-bases sagittate, tailed. *Style*-arms of ♀ slender, of ♀♂ entire or bifid. *Achenes* small, 4–5-angled; pappus 1-seriate, the hairs slender, free or sometimes connate.

PLUCHEA TOMENTOSA, DC.; F. B. I. iii. 272.

Deccan, in Mysore, Bellary and Coimbatore; W. Ghâts, Courtallum in Tinnevelly (Wight).

A large shrub with broadly obovate, dentate, subamplexicaul and auricled leaves, corymbose flowers and 5-angled achenes ciliate on the angles.

19. Epaltes, Cass.

Herbs, erect or diffuse. *Leaves* alternate, usually decurrent, toothed. *Heads* heterogamous, small, disciform, solitary or corymbose; the outer flowers ♀, many-seriate, fertile, the inner ♀♂, usually sterile. *Involucre* hemispheric or broadly campanulate; bracts many-seriate, dry, rigid. *Receptacle* flat or convex, naked. *Corollas* of ♀ flowers filiform, minutely 2–3-toothed; of ♀♂ flowers tubular or funnel-shaped, the limb 3–5-lobed. *Anther*-bases sagittate, shortly tailed. *Style*-arms of ♀ slender, of ♀♂ entire or bifid, papillose. *Achenes* of ♀ flowers smooth or ribbed, of ♀♂ usually abortive; pappus 0 or in some ♀♂ flowers of 2–3 caducous hairs.

Heads ·2–·3 in. in diam.; involucral bracts longer than the flowers; achenes obovoid, ribbed and glandular, pale .....1. *divaricata.*

Heads ·1–·2 in. in diam.; involucral bracts shorter than the flowers; achenes ellipsoid, much smaller, smooth and slightly angled, black

2. *pygmæa.*

1. EPALTES DIVARICATA, Cass.; F. B. I. iii. 274.
   All plains Districts in dry country, in watery places.
2. EPALTES PYGMAEA, DC.; F. B. I. iii. 274.
   E. Coast Districts from Madras to Tinnevelly.

20. Sphaeranthus, Linn.

Annual herbs with spreading branches. *Leaves* alternate, toothed, decurrent on the stem. *Heads* small, heterogamous, not rayed, collected together in close terminal globose or ovoid clusters, the said clusters crowded on a large common receptacle and often having a general involucre of empty bracts at their base, each head with few or many outer flowers ♀, fertile, and few inner flowers ♀♂, fertile or sterile. *Involucre* narrow, with few or many paleaceous bracts. *Receptacle* small, naked. *Corollas* of ♀ flowers slender, tubular, minutely 2–3-toothed, of ♀♂ with tubular funnel-shaped or globular thickened tube and 4–5-lobed limb. *Anther*-bases sagittate, auricles acute or tailed. *Style*-arms filiform, sometimes connate. *Achenes* terete or angled, glabrous or villous, often glandular, those of ♀ and ♀♂ often different; pappus 0.

Clusters of heads ovoid, ·5–1 in. long, spinous from the exserted tips of the bracts; outer involucre present; ♀♂ corolla tubular; leaves linear-oblong, obtuse, serrulate, slightly decurrent; achenes of ♀ stalked, ovoid, villous, of ♀♂ larger, sessile, glabrous
1. *amaranthoides.*

Clusters of heads globose, bracts not exserted, no outer involucre; leaves long-decurrent:—

Clusters ·2–·4 in. in diam., bracts spathulate, dentate at apex; wings of stem entire, leaves obovate, denticulate, glabrous; ♀♂ corolla funnel-shaped; achenes small, angled, glandular
2. *africanus.*

Clusters ·5–·6 in. in diam., bracts spathulate, acute, ciliate; wings of stem toothed; leaves obovate-oblong, toothed or serrate, villous; ♀♂ corolla globosely inflated below; achenes angular, subglabrous
3. *indicus.*

1. SPHAERANTHUS AMARANTHOIDES, Burm. f.; F. B. I. iii. 274. *Oligolepis amaranthoides*, Wt. Ic. t. 1149.
   Deccan and Carnatic from Mysore southwards, in rice-fields and near the sea-coast.
   An erect stout-stemmed herb, smelling of mint, the head-clusters cone-like, red.

2. SPHAERANTHUS AFRICANUS, Linn.; F. B. I. iii. 275.
   E. Coast, in S. Canara and Malabar, in swampy places.
   A slender glabrous fragrant herb with white (Rangachari) or purple (Cooke) flowers.
3. SPHAERANTHUS INDICUS, Linn.; F. B. I. iii. 275. *S. hirtus*, Willd.; Wt. Ic. t. 1094.
   All plains Districts, in wet places, especially rice-fields, common.
   An aromatic herb with glandular-hairy stem and branches and pink or purple flowers.

21. Blepharispermum, Wight.

Glabrous shrubs. *Leaves* alternate, entire or toothed. *Heads* small, heterogamous, not rayed, collected together in close globose clusters, the said clusters sessile on an oblong or cylindric common receptacle bracteate at the base, each head with few outer flowers ♀, fertile, and few inner flowers ♀♂, fertile or sterile. *Involucre* of 1–2 bracts shorter than the paleae of the receptacle. *Receptacle* small or cylindric with rigid paleae enclosing the flowers. *Corollas* of ♀ flowers slender, tubular, 3–4-lobed, of ♀♂ tubular, enlarged above, the limb campanulate 5-lobed. *Anther*-bases sagittate, the auricles tailed, connate. *Style*-arms of ♀ linear, of ♀♂ stout, obtuse, papillose. *Achenes* of fertile flowers compressed, black, the margins ciliate, the outer ones with a ciliate rib; pappus in sterile flowers 0, in fertile flowers of unequal paleae or bristles.

Leaves long petioled, ovate, membranous, acuminate, up to 7 in. long, 3 in. broad; bracts of common receptacle small; clusters of heads ·3–·6 in. in diam. in long-peduncled corymbs .....1. *petiolare.*
Leaves short petioled, elliptic or obovate, coriaceous, obtuse or slightly acute, up to 5 in. long, 2·5 in. broad; bracts of common receptacle leafy; clusters of heads 1–1·5 in. in diam., solitary .....2. *subsessile.*

1. BLEPHARISPERMUM PETIOLARE, DC.; F. B. I. iii. 276; Wt. Ic. t. 1092.
   W. Ghâts, hills of Tinnevelly at about 1,000 ft.
   A glabrous shrub, climbing by means of its divaricate branches, the woody stem attaining nearly 1 in. in diam.; bark grey (Trimen Fl. Ceyl. iii. 27).
2. BLEPHARISPERMUM SUBSESSILE, DC.; F. B. I. iii. 276; Wt. Ic. t. 1093.

Deccan, in Mysore, Ramandrug in Bellary to N. Nilgiris, at 2,000–3,000 ft.

An erect shrub about 3 ft. high.

22. Anaphalis, DC.

Perennial herbs or small shrubs, cottony or woolly. *Leaves* alternate. *Heads* heterogamous, not rayed, corymbose, outer flowers ♀; in many rows, fertile; inner ♀, usually sterile. *Involucre* campanulate turbinate or subglobose, usually woolly at base; bracts many-seriate, the outer sessile, the middle ones longer and clawed, the inner narrow and clawed, the limb white or tinged with yellow or pink. *Receptacle* naked. *Corollas* of ♀ flowers filiform, 2–4-toothed; of ♀ flowers tubular, limb 5-toothed, often glandular, all usually yellow. *Anther*-bases sagittate, tailed, the auricles connate. *Style*-arms obtuse or capitate. *Achenes* small, oblong, terete or angled, usually minutely scaly or papillose; pappus 1-seriate, the hairs sometimes connate at the base, but usually free and caducous, scabrid, the tips often feathery.

Leaves prominently 5-ribbed from the narrowed semi-amplexicaul base, the margins only sometimes folded back, both surfaces covered with densely appressed cinnamomeous or greyish tomentum, up to 4 in. long, ·75 in. broad; heads small, in dense rounded corymbose clusters, ♀ flowers about 16; bracts oblong, obtuse, white; achenes oblong, papillose-scabrous ..... 1. *Beddomei.*

Leaves 3- or more-ribbed from the base, the ribs concealed by soft cottony wool:—

Leaf margins prominently folded back, the leaves oblong or oblong-lanceolate, densely congested at the base and deflexed, sparse above, up to 1·5 in. long; heads large, ·4 in. in diam., in compact terminal woolly corymbs, flowers very many; bracts white, the limb ovate, recurved; achenes minutely scaly 2. *travancorica.*

Leaf-margins flat, not or very slightly folded back:—

Leaves elliptic, covered with white wool, obtuse at base and slightly decurrent, up to 2 in. long, 1 in. broad; heads small, ·2–·3 in. broad, in densely compacted terminal single or branched corymbs, ♀ flowers about 12, sometimes 0; bracts white, tinged when fresh with pink or yellow, limb lanceolate, acute; achenes white-hairy ..... 3. *elliptica.*

Leaves oblong, covered with smoky or tawny wool, semi-

amplexicaul, up to 1 in. long, ·25 in. broad; heads very small, ·1–·2 in. broad, in many-branched terminal corymbs, ♂ flowers about 30; bracts yellow or pink, oblong or obovate, the apex toothed; achenes papillose ..... 4. *Notoniana.*

Leaves 1-ribbed only but sometimes with oblique nerves not starting from the base:—

Leaves usually 1 in. long or more:—

Leaf-margins flat, leaves linear-oblong, acute, subamplexicaul and very slightly decurrent, up to 1–1·5 in. long, the basal short and obovate, closely white-woolly; heads small, ·25 in. broad, in close terminal sometimes branched corymbs, ♂ few or many, usually fertile; bracts white or pink-tinged, acute; achenes papillose ..... 5. *subdecurrens.*

Leaf-margins flat, not folded back except the upper ones of the scape, which are closely pressed and ascending; leaves linear-oblong or oblanceolate, very white-woolly, 1–3·5 in. long, ·3 in. broad; heads ·2–·3 in. broad, in broad corymbs of many branches; bracts white, limb ovate, acute; achenes minute, scaly 6. *Lawii.*

Leaf-margins always folded back:—

Leaves glabrous and dark green on the upper surface except when quite young, linear, 1–2 in. long, ·1 in. broad, spreading or reflexed; heads small, in dense rounded, single or branched corymbs; bracts white, the limb lanceolate, acute; achenes pubescent ..... 7. *marcescens.*

Leaves crispately scabrous on the upper surface, semi-amplexicaul at base; heads in compact clusters:—

Heads small, ·1 in. broad, few flowered; bracts oblanceolate, dentate at tip; leaves tapering upwards from a broad base to the slender apex, not decurrent, under surface with grey wool; achenes papillose..... 8. *aristata.*

Heads ·25 in. broad, many-flowered; bracts oblong, acute; leaves linear-oblong, obtuse at apex, the upper stem leaves shortly hooked, under-surface with grey or white wool; achenes roughly papillose ..... 9. *Wightiana.*

Leaves softly cottony on both surfaces, linear or linear-oblanceolate, 1–2 in. long, ·1 in. broad, mucronate; heads few, large, ·3 in. broad, many-flowered, in small subumbellate terminal corymbs; bracts white, lanceolate, acute; achenes short, angular, minutely papillose ..... 10. *leptophylla.*

Leaves less than 1 in. long, usually under ·3 in., the margins revolute; subshrubby plants with many flowerless leafy branchlets:—

Cauline leaves very many, close, spreading or curved upwards, linear, ·3 in. long; heads very small, ·15 in. broad, in close terminal corymbs ·5–·7 in. broad; bracts yellowish-white, the limb orbicular; achenes elongate, angled, minutely papillose ..... 11. *Meeboldii.*

Cauline leaves distant, appressed, linear, ·3–·4 in. long:—

Branches slender, flowering ones elongate, to 12 in. or more, non-flowering 1–3 in., the leaves not very closely compacted; heads ·3–·4 in. broad, in compact terminal corymbs about ·75–1 in. broad; bracts white, the limb ovate, acute; achenes 3–4-angled, minutely scaly ..... 12. *Bournei.*

Branches thick, woody, flowering ones 3–10 in. long, non-flowering very short, scarcely 1 in., densely compacted; heads ·2–·25 in. broad, in compact terminal corymbs 1–1·5 in. broad; bracts with the limb ovate, usually obtuse; achenes terete, minutely scaly ..... 13. *Neelgerryana.*

1. ANAPHALIS BEDDOMEI, Hook. f.; F. B. I. iii. 282.
   W. Ghâts, Pulney Hills, about 7,000 ft., on the downs.
   A loose undershrub, the main stem decumbent, the branches erect, leafy.
2. ANAPHALIS TRAVANCORICA, W W Smith in Rec. Bot. Surv. Ind. iv. 284.
   W. Ghâts, Pulney Hills and hills of Travancore, above 7,000 ft.
   A large herb, somewhat shrubby at base, with large flower-heads.
3. ANAPHALIS ELLIPTICA, DC.; Wt. Ic. t. 1118. *A. oblonga*, DC. var. *elliptica*, Hook. f.; F. B. I. iii. 283.
   W. Ghâts, Nilgiri and Anamalai Hills, above 7,000 ft.
   A soft very white woolly herb, the bracts white or pink.
4. ANAPHALIS NOTONIANA, DC.; F. B. I. iii. 284; Wt. Ic. t. 1116.
   W. Ghâts, Nilgiri Hills, above 7,000 ft.
   A well-marked pretty herb with yellow or pink bracts and tawny tomentum.
5. ANAPHALIS SUBDECURRENS, Gamble n. comb. *Gnaphalium subdecurrens*, DC. in Wt. Contrib. 21. *A. oblonga*, DC.; F. B. I. iii. 283 *in part.*
   W. Ghâts, in all Districts from Coorg southwards above about 4,000 ft., in grassy lands and on the downs.

A variable herb, at high elevations and in dry places short and compact and much branched; at lower ones the corymb-bearing stems longer, the corymbs more branched and the leaves more scattered.

6. ANAPHALIS LAWII, Gamble n. comb. *A. oblonga*, DC. var. *Lawii*, Hook. f.; F. B. I. iii. 283.

N. Circars, Mahendragiri Hill in Ganjam at 4,500 ft.; Deccan, on Nandidrúg; W. Ghâts, Coorg, Bababudan Hills of Mysore, Brahmagiris, hills of Coimbatore, N. Nilgiris, Anamalais, Pulneys and hills of Tinnevelly, at 5,000–7,000 ft.

A wide-spread, common and variable, very white and tall herb, the bracts sometimes pinkish.

7. ANAPHALIS MARCESCENS, C. B. Clarke; F. B. I. iii. 286. *Gnaphalium marcescens*, Wt. Ic. t. 1115.

W. Ghâts, Nilgiri Hills, on the banks of streams, above 7,000 ft.; Coorg, at Mercara (Bourne).

A graceful small species, the corolla-lobes very glandular.

8. ANAPHALIS ARISTATA, DC.; F B. I. iii. 285; Wt. Ic. t. 1119.

W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft.

A strong-smelling viscid herb with woody rootstock, the bracts pink-tipped.

9. ANAPHALIS WIGHTIANA, DC.; F. B. I. iii. 286; Wt. Ic. t. 1117.

W. Ghats, Nilgiri and Pulney Hills and hills of Tinnevelly, above 6,000 ft., in cool places and on the banks of streams.

An erect herb with woody rootstock, the bracts white.

10. ANAPHALIS LEPTOPHYLLA, DC.; F. B. I. iii. 285.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore and Tinnevelly, above 5,000 ft., in damp places on the downs.

A very slender herb with large flower-heads.

11. ANAPHALIS MEEBOLDII, W. W. Smith in Rec. Bot. Surv. Ind. iv. 284.

W. Ghâts, grassy hills in the Anamalais at 8,000 ft. (Barber, Fischer); Devicolam, Travancore, above 5,000 ft. (Meebold, Bourdillon).

A much-tufted woody plant about 1 ft. high with thick rootstock and many branches, both with flower-heads and without.

12. ANAPHALIS BOURNEI, Fyson in Kew Bull. 1914, 209.
W. Ghâts, Nilgiris, Anamalais, Pulneys (common) and hills of Travancore above 6,000 ft.
A much-branched low bush with long slender flowering branches.

13. ANAPHALIS NEELGERRYANA, DC.; F. B. I. iii. 287; Wt. Ic. t. 478.
W. Ghâts, Nilgiri Hills, above 7,000 ft., usually on dry slopes and in rocky places.
A low, much-branched shrub.

23. Gnaphalium, Linn.

Hoary or woolly herbs. *Leaves* alternate, entire. *Heads* heterogamous, small, not rayed, in terminal or axillary corymbs or fascicles, outer flowers ♀, very many, in 2–many-rows, fertile, inner ♀, few, fertile. *Involucre* ovoid or campanulate; bracts many, imbricate, all scarious or with a white yellow or brown scarious blade, the claw usually thickened. *Receptacle* naked or pitted. *Corollas* of ♀ flowers filiform, 3–4-toothed, of ♀ flowers tubular, shortly 5-lobed. *Anther*-bases sagittate, with slender tails. *Style*-arms slender, truncate or capitate. *Achenes* small, oblong or obovoid, usually minutely scaly or papillose; pappus-hairs 1-seriate, plumose, slender or thickened at tip, more or less connate at base, caducous.

Heads in corymbs :—

Heads golden-yellow or brown; stems usually many from the roots, like the leaves softly white-woolly; leaves oblong-spathulate, semi-amplexicaul, upper lanceolate, about 2 in. long; ♀ flowers in each head about 4 ..... 1. *luteo-album.*

Heads pale yellow; stems single, stout, branching above, not very woolly; leaves linear, acuminate, semi-amplexicaul and more or less decurrent, scaberulous above, not woolly, about 1–1·5 in. long; ♀ flowers in each head 10–12 ..... 2. *hypoleucum.*

Heads in leafy spikes, pale reddish- or yellowish-brown, the leaves and stems softly white-woolly; leaves linear obovate or -spathulate, apiculate, usually under 1 in. long, but sometimes longer; ♀ flowers in each head 2–3; bracts linear-oblong, acute, the outer woolly 3. *indicum.*

Heads in rounded, axillary or terminal leafy clusters, the whole plant white-woolly; leaves small, spathulate, the lower ones some-

times 1 in. long, the upper, which support the heads, much smaller; ♂ flowers about 4; bracts linear-lanceolate, acute .....4. *pulvinatum.*

1. GNAPHALIUM LUTEO-ALBUM, Linn.; F. B. I. iii. 288.
   Occasional, in most Districts, especially Nilgiris, about 7,000 ft., not common.
   An annual wide-spread conspicuous weed.

Var. *pallidum*, Hook. f. Heads pale brown instead of golden yellow.
   Nilgiri and Anamalai Hills at high levels (Beddome. Bourne).

2. GNAPHALIUM HYPOLEUCUM, DC.; F. B. I. iii. 288; Wt. Ic. t. 1114.
   W. Ghâts, Nilgiri and Pulney Hills, above 7,000 ft.
   An erect stout "everlasting."
3. GNAPHALIUM INDICUM, Linn.; F. B. I. iii. 289.
   All Districts, a common weed of roadsides and waste lands.
   A soft white woolly annual.
4. GNAPHALIUM PULVINATUM, Delile; F. B. I. iii. 289.
   N. Circars, in Ganjam, roadsides and waste lands.
   A soft prostrate woolly annual.

24. Helichrysum, Gaertn.

Herbs or shrubs, often woolly. *Leaves* alternate, entire. *Heads* heterogamous or homogamous, not rayed, solitary or in corymbs; in homogamous heads all flowers ♂♀; in heterogamous heads outer 1 or rarely 2 rows ♀, fertile, inner ♂, usually fertile. *Involucre* various; bracts many-seriate, scarious, imbricate, yellow red brown or white. *Receptacle* flat, naked or pitted, the pit-margins bristly or paleaceous. *Corollas* of ♀ flowers filiform, minutely toothed, of ♂ tubular, the limb 4–5-toothed. *Anther*-bases sagittate, tailed. *Style*-arms of ♀ slender, of ♂ thickened, subcapitate. *Achenes* small, terete angled or subcompressed, often papillose-scabrous; pappus 1–many-seriate, free or connate below, dilated or feathery above.

All leaves from the base to the inflorescence similar or nearly so, the cauline spreading:—

Shrub; leaves thick, lanceolate, usually ·5 in. broad, glabrous

above, grey or cinnamomeous-cottony beneath, 5–7-ribbed, the ribs impressed, apex acute and hooked, base semi-amplexicaul, margins often folded back; bracts yellow, the limb short, obtuse; achenes scabrid .....1. *buddleioides.*

Undershrub; leaves thin, oblanceolate, usually 1 in. broad, glabrous above when old, sparsely cottony when young, softly cinnamomeous-cottony beneath, 5-ribbed, the ribs not impressed, apex obtuse or acute and then hooked, base semi-amplexicaul, margins sometimes slightly folded back; bracts pale yellow or white, the limb short and obtuse; achenes scaly.....2. *Hookerianum.*

Basal leaves much larger than the cauline, which are small and appressed:—

Basal leaves in rosette covered with soft spreading tawny wool, thin, 5-ribbed, the ribs not impressed, lanceolate from a broad base, up to 3 in. long, 1 in. broad, cauline leaves about 1 in. long, lanceolate, acute; bracts white or yellowish, the limb ovate, obtuse or acute; achenes black, scaly.....3. *perlanigerum.*

Basal leaves in short flowerless branches from a woody rootstock, linear lanceolate, thick, acute and hooked at tip, semi-amplexicaul, prominently 5–7-ribbed, the ribs impressed, both surfaces with appressed cinnamomeous wool, margins folded back; bracts white or yellowish, rather long, the limb ovate, acute; achenes scaly 4. *Wightii.*

1. HELICHRYSUM BUDDLEIOIDES, DC.; F. B. I. iii. 290; Wt. Ic. t. 1113.

   W. Ghâts, Bababudan Hills of Mysore, Nilgiris, Anamalais and Pulneys, above 6,000 ft.

   A shrub reaching 12 ft. in height with conspicuously ribbed leaves. Bark brown, fibrous; wood grey, hard and close-grained.

2. HELICHRYSUM HOOKERIANUM, W & A. in DC. Prod. vi. 201. *H. buddleioides*, var. *Hookeriana*, Hook. f.; F. B. I. iii. 291.

   W. Ghâts, Anamalais, Pulneys and hills of Travancore and Tinnevelly at 3,000–4,500 ft.

   An undershrub with much soft wool.

3. HELICHRYSUM PERLANIGERUM, Gamble in Kew Bull. 1920. 341.

   W. Ghâts, Anamalai Hills at 6,000–7,000 ft. (Beddome).

   An undershrub with very soft spreading floccose wool.

4. HELICHRYSUM WIGHTII, C. B. Clarke; F. B. I. iii. 291.
W. Ghâts, Nilgiris, above Sispara at 7,500 ft. (Wight, Lawson, Gamble).
A herbaceous plant with many flowerless and few flower-bearing branches from a woody rootstock.

25. Carpesium, Linn.

Erect branched herbs. *Leaves* alternate. *Heads* heterogamous, not rayed, yellow, usually drooping, terminal or axillary, sessile or peduncled; outer flowers ♀, fertile, inner ♂, fertile. *Involucre* hemispheric or subglobose; bracts in few series, inner dry, outer with foliaceous tips. *Receptacle* flat, naked. *Corollas* of both ♀ and ♂ all tubular, but the former without stamens; lobes 4–5. *Anther*-bases sagittate, tails slender. *Style*-arms linear, short, obtuse. *Achenes* elongate, striate, with an often glandular beak crowned by a thickened ring; pappus 0.

CARPESIUM CERNUUM, Linn.; F. B. I. iii. 300.
Var. *nilagiricum*, C. B. Clarke. *C. nepalense*, Wt. Ic. t. 1120.
W. Ghâts, Nilgiri and Pulney Hills in Shola forests, above 6,000 ft.
An erect herb with yellow drooping solitary flowers and villous ovate-lanceolate, shortly serrate leaves up to 6 in long, 2 in. broad. The achenes are sticky and are troublesome, adhering to the clothes.
Var. *ciliatum*, Hook. f. A slender herb with small elliptic-ovate or lanceolate slightly serrate leaves under 1 in. long, the heads ·5 in. in diam.
Travancore (Herb. Rottler in Wall. Coll. 3214).

26. Vicoa, Cass.

Annual or perennial herbs. *Leaves* alternate, entire or toothed, the upper amplexicaul. *Heads* heterogamous, rayed, or (from absence of ray) homogamous and not rayed, solitary, terminal or on leaf-opposed pedúncles; ray-flowers ♀, fertile, 1–2-seriate; disk-flowers ♂, many, fertile. *Involucre* campanulate; bracts many-seriate, narrow, with scarious margins, the outer shorter. *Receptacle* flat or subconvex, naked. *Corollas* of ray-flowers 2–3-toothed, of disk-flowers tubular, slender, shortly 5-lobed. *Anther*-

bases sagittate, the tails slender. *Style*-arms of ♀ flowers linear, of ♀̊ flowers flattened, obtuse or truncate. *Achenes* small, terete, villous; pappus of ray-flowers scanty or 0, of disk-flowers of few slender hairs.

Leaves sessile, lanceolate or oblong-lanceolate, auricled at base; involucral bracts erect; pappus of ray-flowers 0.....1. *indica.*
Leaves shortly petioled, elliptic-lanceolate, not auricled at base; involucral bracts squarrose; pappus of ray-flowers scanty or 0
2. *cernua.*

1. VICOA INDICA, DC.; Wt. Ic. t. 1148. *V. auriculata*, Cass.; F. B. I. iii. 297.
   All Forest Districts, in the undergrowth of deciduous forest, common.
   An erect herb with bright yellow flowers.
2. VICOA CERNUA, Dalz.; F. B. I. iii. 297.
   W. Ghâts, hills of Mysore and Wynaad, at about 3,000–4,000 ft.
   An erect annual slender herb.

27. Pulicaria, Gaertn.

Annual or perennial herbs, usually villous. *Leaves* alternate, sessile, often amplexicaul. *Heads* yellow, solitary, heterogamous and rayed or homogamous from the absence of rays; ray-flowers ♀, disk flowers ♀̊, fertile. *Involucre* hemispheric or obconic, bracts in few series, narrow, acuminate or awned. *Receptacle* flat or convex, pitted. *Corollas* of ♀ flowers ligulate and 2–3-toothed or tubular, of ♀̊ flowers tubular, slender, shortly 5-lobed. *Anther*-bases sagittate, the tails capillary, simple or branched. *Style*-arms of ♀ flowers slender, of ♀̊ flowers linear, obtuse, slightly flattened. *Achenes* terete or ribbed; pappus double, the outer of short jagged scales, the inner of scabrid or bearded filiform or flattened hairs.

Involucral bracts subequal; ray-flowers ligulate, achenes sparsely hairy:—
Plant 1–2 ft. high; peduncles thickened upwards; leaves linear-oblong, serrate, pubescent, crowded on the stems, usually over ·5 in. broad.....1. *Wightiana.*
Plant less than 1 ft. high; peduncles not thickened upwards;

leaves linear-oblong, entire or serrulate, pubescent, distant on the stems, under ·5 in. broad..... .....2. *angustifolia.*

1. PULICARIA WIGHTIANA, C. B. Clarke; F. B. I. iii. 298. *Callistephus Wightianus*, DC.; Wt. Ic. t. 1089.
   Deccan and E. slopes of the Ghâts, in dry hill forests, up to 4,000 ft.
   A much branched annual leafy herb.
2. PULICARIA ANGUSTIFOLIA, DC.; F. B. I. iii. 299.
   Deccan, in dry open forests in Kistna and Kurnool to Mysore and Bellary.
   A branching annual with slender stems.

28. Caesulia, Roxb.

A glabrous marsh herb. *Leaves* alternate, lanceolate, serrulate, *Heads* axillary, sessile, homogamous, not rayed, all flowers ♂, fertile. *Involucre* large, membranous; bracts 2, orbicular or ovate. *Receptacle* with lanceolate stramineous paleae to the outer flowers, glabrous. *Corollas* tubular, deeply 5-lobed, the lobes linear. *Anther*-bases sagittate, tails of a bundle of fine hairs. *Style*-arms short, clavate. *Achenes* flat, obovoid, winged on each side, sparsely hairy; pappus of 2 ovate scales above the wings.

CAESULIA AXILLARIS, Roxb. Cor. Pl. t. 93; F. B. I. iii. 291; Wt. Ic. t. 1102.
Most plains Districts, especially on E. Coast, in ricefields.
A prostrate or suberect herb with pale blue or lilac flowers in the axils of the narrow leaves.

29. Xanthium, Linn.

Annual herbs. *Leaves* alternate, toothed or lobed. *Heads* monoecious, not rayed, the ♂ in upper axils, globose, sterile; the ♀ below, 2-flowered, apetalous, fertile. *Involucre* of ♂ heads short, bracts few, small; of ♀ with the bracts united in a closed 2-horned utricle with 2 cells and clothed with hooked bristles. *Receptacle* of ♂ cylindric with hyaline paleae enclosing the flowers. *Corollas* of ♀ 0, of ♂ tubular, 5-lobed, very thin. *Anthers* distinct, the bases obtuse, the tips inflexed; filaments monadelphous. *Style*-arms of ♀ flowers 2, long, exserted, of

♂ short. *Achenes* 2 to each head, enclosed in a 2-beaked utricle formed by the hardened involucre and covered with hooked spines; pappus 0.

XANTHIUM STRUMARIUM, Linn.; F. B. I. iii. 303. *X. indicum*, Roxb.; Wt. Ic. t. 1104.

Most plains Districts, on waste ground, roadsides and rubbish-heaps, chiefly near houses.

A coarse annual plant with scabrid triangular-cordate, often 3-lobed, irregularly toothed leaves and large 2-celled fruit with strong hooks.

30. Lagasca, Cav.

Rigid villous or subglabrous herbs. *Leaves* opposite or alternate, entire or toothed. *Heads* 1-flowered on a common receptacle supported by bract-like leaves; all flowers ♂, fertile, white red or yellow. *Involucre* tubular; bracts 4–5, connate. *Receptacle* small. *Corolla* regular, tube short, limb elongate, cylindric or dilated, lobes 5. *Anther*-bases sagittate, auricles obtuse. *Style*-arms long, curved, hairy. *Achenes* cuneate, compressed or 3-angled; pappus a toothed or fimbriate cup.

LAGASCA MOLLIS, Cav.; F. B. I. iii. 302.

Deccan, in Cuddapah, Chittoor, Bellary and Mysore, an introduced Central American plant, now run wild.

A grey-pubescent herb with ovate acuminate leaves and white flowers in a solitary head-like terminal leafy inflorescence.

31. Moonia, Arn.

Herbs or undershrubs. *Leaves* opposite, petioled, entire or pinnate, toothed. *Heads* heterogamous, rayed, solitary on terminal or axillary slender peduncles; outer flowers ♀, fertile, uniseriate, inner ♂, many sterile. *Involucre* campanulate, bracts few-, usually 2-seriate, thin, leafy, the outer larger and often recurved. *Receptacle* flat, with oblong membranous scales embracing the disk flowers. *Corollas* of ♀ flowers with a 3-fid ligule, of ♂ tubular, 4–5-lobed. *Anther*-bases subsagittate. *Style*-arms of ♀ 2, linear, revolute, of ♂ undivided, pubescent. *Achenes* obovoid, compressed, smooth, usually keeled at the margins; pappus 0 or of 2 minute hairs.

Rays of the ♀ flowers narrow, deeply cleft in linear lobes; bracts ·2–·3 in. long, ciliate on the margins ..... 1. *heterophylla.*
Rays of the ♀ flowers broad, shortly and obtusely 3-lobed; bracts ·4–·5 in. long, not ciliate on the margins..... .....2. *Arnottiana.*

1. MOONIA HETEROPHYLLA, Arn. Pug. 31. *Chrysogonum heterophyllum*, C. B. Clarke; F. B. I. iii. 303.
   W. Ghâts, Pulney Hills and hills of Tinnevelly and Travancore, above 6,000 ft., in damp shady places.
   A perennial undershrub with golden-yellow flowers and pinnate or deeply pinnatisect serrate leaves.
2. MOONIA ARNOTTIANA, Wt. Ic. t. 1015. *Chrysogonum Arnottianum*, C. B. Clarke; F. B. I. iii. 303.
   W. Ghâts, Mysore, Nilgiri Hills, above 6,000 ft., on the margins of Sholas, especially between Avalanché and Sispara; Atapadi Hills of Malabar (Fischer).
   A perennial undershrub, very like the last, but with larger yellow flowers.

Acanthospermum hispidum, DC., a South American introduced plant, has been found in S. Canara and Salem Districts, and is said to be spreading and likely to become common. The plant is hairy, the leaves obovate, spathulate; the heads in the forks of dichotomous branches, the achenes spinous.

32. Siegesbeckia, Linn.

Glandular pubescent herbs, annual. *Leaves* opposite, toothed, shortly petioled. *Heads* heterogamous, rayed, in leafy panicles; outer flowers ♀, fertile, 1-seriate, inner ♀, fertile or the innermost sterile. *Involucre* campanulate or hemispheric; bracts few, herbaceous, with many stalked viscid glands, outer narrow spathulate spreading, inner enclosing the ray-flowers. *Receptacle* small; paleae membranous, concave, enclosing the flowers. *Corollas* of ♀ ray-flowers spreading, 2–3 lobed; of ♀ flowers tubular and glandular hairy below with a campanulate 5-lobed limb. *Anther*-bases obtuse, tips incurved. *Style*-arms of both ♀ and ♀ 2, flattened, recurved. *Achenes* glabrous, obovoid, angled, often curved, truncate; pappus 0

SIEGESBECKIA ORIENTALIS, Linn.; F. B. I. iii. 304; Wt. Ic. t. 1103.
All Districts, in waste places, by roadsides and in second-growth forest, at all elevations.

A large annual herb with yellow flowers and large ovate-triangular deeply-cut leaves, the flower-heads glandular and very sticky, adhering to the clothing.

33. Eclipta, Linn.

Strigosely hirsute annuals. *Leaves* opposite. *Heads* small, heterogamous, rayed, on axillary or terminal peduncles; outer flowers ♀, sub-biseriate, fertile or sterile, inner ♀, tubular, with 4–5 lobes, fertile. *Involucre* campanulate; bracts biseriate, leafy, the outer broad, about 5, inner narrower, about 3. *Receptacle* flattened, with plumose slender paleae to each flower. *Corollas* of ♀ flowers linear, entire or 2-fid, white; of ♀ tubular with 4–5 lobes. *Anther*-bases obtuse. *Style*-arms short, obtuse. *Achenes* of ray-flowers triquetrous, warted, of disk-flowers compressed; pappus of 1–2 minute teeth.

ECLIPTA ALBA, Hassk.; F. B. I. iii. 304.

All Districts and at all elevations, in waste places and on roadsides, common.

An annual herb with small flowers with white rays and lanceolate-oblong strigose leaves, branches erect or prostrate, the erect plants usually with lanceolate-oblong leaves often 3 in. long, the prostrate ones with short leaves scarcely ·5 in. long, but there are many intermediate forms.

34. Sclerocarpus, Jacq.

Herbs, strigose or villous. *Leaves* opposite or alternate, petioled. *Heads* heterogamous, rayed, terminal or axillary or leaf-opposed; outer flowers ♀, 1-seriate, sterile, inner flowers ♀, fertile. *Involucre* campanulate; bracts few, biseriate, all or the tips herbaceous, outer spreading. *Receptacle* convex, with many chaffy paleae embracing the ♀ flowers and finally hardening round the achenes. *Corollas* of ray-flowers with broad spreading yellow 0–3-lobed ligules, of ♀ flowers tubular, 5-lobed. *Anther*-bases obtuse. *Style*-arms of ray-flowers recurved, slender, of ♀ flowers short, subclavate. *Achenes* obovoid, subcompressed, curved, narrowed below, enclosed in the rough, rugose or ribbed, often beaked paleae; pappus 0 or a short ring of scales.

SCLEROCARPUS AFRICANUS, Jacq.; F. B. I. iii. 305.

Deccan, Gersakal in Coimbatore, at 5,000 ft. (Fischer).

An erect annual herb with yellow flowers, ovate acute serrate strigosely hairy leaves and a beaked, ribbed fruit.

35. Blainvillea, Cass.

Erect, scabrid or villous herbs. *Leaves* opposite or the upper alternate, petioled, toothed. *Heads* small, heterogamous, rayed or subdisciform, terminal or axillary, subsessile or peduncled; the outer ♀, 1-2-seriate, fertile, the inner ♂, fertile. *Involucre* ovoid or subglobose; bracts few, outer herbaceous, inner passing into the paleae of the receptacle. *Receptacle* small, convex, with many folded, rigid, membranous paleae enclosing the flowers. *Corollas* of ♀ flowers of short 2-3-toothed ligules, sometimes absent, of ♂ tubular with campanulate 4-5-lobed limbs. *Anther*-bases obtuse. *Style*-arms of ♀ flowers short, flattened, of ♂ narrow, flattened. *Achenes* truncate, of ♀ 3-quetrous or compressed, of disk 3-4-angled or compressed; pappus 0, or of 2-5 short scales or bristles.

BLAINVILLEA RHOMBOIDEA, Cass. *B. latifolia*, DC.; F. B. I. iii. 305.

All Districts and up to 5,000 ft. in the hills, in fields and waste places, common.

A rigid scabrous herb with yellowish or white flowers, many branches, ovate serrate 3-nerved leaves and cuneate achenes marked with faint horizontal lines.

36. Wedelia, Jacq.

Herbs or shrubs, sometimes scandent, scabrid pubescent or hirsute. *Leaves* opposite, often triple-nerved. *Heads* heterogamous, rayed, yellow, axillary or terminal; outer flowers ♀, fertile, inner ♂, fertile, or the inner sterile. *Involucre* campanulate or subhemispheric; bracts usually biseriate, the outer herbaceous. *Receptacle* flat or convex with paleae folded or concave enclosing the flowers. *Corollas* of ♀ flowers ligulate, the ligules spreading, entire or 2-3-toothed, of ♂ flowers tubular with 5-lobed limb. *Anther*-bases [illegible] subsagittate. *Style*-arms of ♀ slender, of ♂ clavate. *Achenes* cuneate,

triquetrous or compressed, truncate, smooth or tubercled; pappus 0 or a ring of small scales.

Heads solitary on slender peduncles 2–5 in. long; ray-ligules oblong, ·2 in. long, 2–3-lobed; leaves linear-oblong or oblanceolate, subsessile, entire or irregularly subserenate, roughly scabrous; achenes of ray triquetrous, of disk compressed, all tuberculate.....1. *calendulacea.*

Heads 1–3 together, peduncles under 3 in. long:—

Erect herbs; leaves ovate, acute or acuminate, closely and sharply serrate, hispid; heads usually solitary, ray-ligules suborbicular or oblong, ·25 in. long, minutely emarginately lobed; achenes cuneate, triquetrous, truncate, smooth below, rough and hairy at apex

2. *urticaefolia* var. *Wightii.*

Climbing shrub; leaves ovate, acute or acuminate, distantly serrate, pubescent but not hispid; heads usually in pairs, or threes in dichasia, ray-ligules obovate, ·3 in. long, 2–3-lobed; achenes 3–4-angled, smooth, pubescent at the truncate apex

3. *biflora.*

1. WEDELIA CALENDULACEA, Less.; F. B. I. iii. 306; Wt. Ic. t. 1107.

Plains Districts, especially on E. and W. Coast, in wet places.

A procumbent perennial, the stems rooting at the nodes.

2. WEDELIA URTICAEFOLIA, DC.; F. B. I. iii. 306; Wt. Ic. t. 1106.

Var. *Wightii*, DC.

W. Ghâts, in all Districts, at about 3,000–5,000 ft.

An erect hispid herb, sometimes almost an undershrub.

3. WEDELIA BIFLORA, DC.; F. B. I. iii. 306; Wt. Ic. t. 1108.

E. and W. Coast, near the sea.

A climbing shrub.

37. Spilanthes, Linn.

Annual herbs. *Leaves* opposite. *Heads* heterogamous and rayed or homogamous and disciform, on long peduncles, axillary or terminal; ray-flowers when present 1-seriate, ♀ fertile; disk-flowers ♂ fertile. *Involucre* short, ovoid or campanulate; bracts sub-biseriate, unequal. *Receptacle* elongate, paleae enclosing the flowers often connate with the ovary as a stalk. *Corollas* of ♀ flowers ligulate, the ligule small, white or yellow; of ♂ tubular,

limb 4–5-lobed. *Anther*-bases truncate. *Style*-arms long, truncate. *Achenes* of ray triquetrous or dorsally compressed, of disk laterally compressed, ciliate or not at the margins, the faces with short bulbous-based stiff hairs or glabrous; pappus 0 or of 2–3 bristles.

SPILANTHES ACMELLA, Murr.; F. B. I. iii. 307. *S. calva*, Wt. Ic. t. 1109.

All plains Districts, ascending the hills, a common weed.

An erect usually pubescent annual herb with ovate crenate leaves 1–2 in. long. Ligulate flowers are frequently absent. The achenes are normally ciliate on the margins, rough on the faces and with a pappus of 2–3 bristles, but a form (var. *calva*) otherwise the same has them nearly quite glabrous. The flower-heads when chewed have a hot burning taste. A larger form (var. *oleracea*) is cultivated in gardens.

38. Synedrella, Gaertn.

Annual, branched, pubescent or villous, herbs. *Leaves* opposite petioled, toothed. *Heads* heterogamous, rayed, axillary and terminal; ray-flowers 1–2-seriate, ♀, fertile; disk-flowers ♀, fertile. *Involucre* ovoid or oblong; bracts few, 1 or 2 outer foliaceous, the rest passing into the paleae. *Receptacle* flat, paleae flat, scarious. *Corollas* of ♀ flowers ligulate, the ligule short, broad, 2–3-lobed, yellow; of ♀ flowers tubular, limb 4-lobed. *Anther*-bases obtuse. *Style*-arms of ♀ flowers with long acute tips. *Achenes* of ray-flowers dorsally compressed, winged, the wings lacerate; of disk-flowers narrow, compressed or triquetrous, often muricate; pappus of 2 slender awns.

SYNEDRELLA NODIFLORA, Gaertn.; F. B. I. iii. 308.

Plains Districts, occasional on cultivated lands, introduced from Mexico.

An erect dichotomous herb with ovate-lanceolate serrate 3-nerved leaves, and achenes of two very distinct forms, the outer ones winged and spinous on the wings, the inner black and slender and muricate.

Guizotia abyssinica, Cass., F. B. I. iii. 308, is Niger, an African plant cultivated as an oil-seed in the Deccan and Carnatic. It is a stout herb reaching 3 ft. in height and has conspicuous yellow flowers. Vern. *Hind.* Surguja, Ram-til.

39. Glossocardia, Cass.

An annual diffuse branched glabrous herb. *Leaves* alternate, 1–2-pinnatisect, the pinnules linear. *Heads* heterogamous, rayed, small, terminal and axillary; ray-flowers ♀, usually solitary, fertile; disk-flowers few, ☿, fertile. *Involucre* oblong; bracts few, outer 1–3, small, inner oblong, with broad membranous margins. *Receptacle* flat, small; paleae few, flat, linear-lanceolate, scarious. *Corolla* of ♀ flowers ligulate, the ligule bifid; of ☿ tubular with campanulate 4-lobed limb. *Anther*-bases obtuse. *Style*-arms of ♀ flowers very short, of ☿ flowers linear, acute, hispid at tip. *Achenes* narrowly oblong, much compressed dorsally, conspicuously ciliate on the margins, bearded on the face. Pappus of 2 smooth stiff awns.

GLOSSOCARDIA BOSVALLEA, DC.; Wt. Ic. t. 110. *G. linearifolia*, Cass.; F. B. I. iii. 308.

All plains Districts, in sandy places in dry country.

A pretty plant with conspicuous long-ciliate achenes. It has the scent of fennel.

40. Bidens, Linn.

Annual or perennial herbs, sometimes climbing. *Leaves* opposite, entire lobed or 1–2-pinnatisect. *Heads* heterogamous, rayed, in corymbose panicles or subsolitary; ray-flowers 1-seriate, neuter or rarely ♀, disk-flowers ☿, fertile. *Involucre* campanulate or hemispheric; bracts sub-biseriate, outer short, herbaceous, inner membranous. *Receptacle* flat or convex, paleae narrow, nearly flat, subtending the ☿ flowers. *Corollas* of ray-flowers ligulate, the ligules spreading, entire or slightly toothed, white or yellow; of disk-flowers usually yellow, tubular, the limb 5-lobed. *Anther*-bases obtuse or subsagittate. *Style*-arms of ☿ flowers oblong, acute, hairy at tip. *Achenes* 4-gonous or dorsally compressed, linear or cuneiform, often narrowed above; pappus of 2–4 persistent retrorsely barbellate awns.

BIDENS PILOSA, Linn.; F. B. I. iii. 309.

All Districts, both in the plains and hills, common but probably not truly indigenous.

An erect herb with variable leaves. Flowers with white rays and yellow disk, the barbed achenes black and slender, about

·5–·7 in. long, troublesome from the way they adhere to the clothing. The cut-leaved form (var. *bipinnata*, Hook. f.) is the most common one.

B. humilis, H. B. and K., is a pretty yellow-flowered species which has run wild along roadsides in the Nilgiris (see Fyson Hillt. Fl. 237, t. 170).

Cosmos sulphureus, Cav., is a Mexican plant closely allied to *Bidens*, but with larger pink flowers and longer achenes. It is cultivated in gardens and is often found run wild.

41. Glossogyne, Cass.

Perennial glabrous herbs with almost naked scape-like stems and branches. *Leaves* mostly radical, crowded, pinnatifid or cuneate and 3-toothed, cauline alternate or the lower opposite or 0. *Heads* small, heterogamous, rayed, peduncled, corymbose; ray-flowers ♀, fertile, disk-flowers ☿, fertile. *Involucre* small, bracts 2–3-seriate, narrow, the bases connate. *Receptacle* flat; paleae scarious, flat or concave. *Corollas* of ray-flowers ligulate, spreading, entire or 2–3-lobed; of ☿ flowers tubular with 5-lobed limb. *Anther*-bases obtuse. *Style*-arms of ♀ flowers short, of ☿ with long hairy tips. *Achenes* dorsally compressed, linear ovoid or almost winged, truncate; pappus of 2 slender retrorsely barbellate awns

GLOSSOGYNE PINNATIFIDA, DC.; F. B. I. iii. 310.

N. Circars and Deccan, up to 2,000 ft., on sandy ground.

A herb [illegible] thick rootstock, pinnatifid basal leaves with [illegible] very small cauline ones, small yellow flowers and flat striate achenes with barbed awns.

42. Galinsoga, Ruiz et Pav.

Annual herbs. *Leaves* opposite, entire or toothed. *Heads* small, heterogamous, rayed, peduncled, subterminal and axillary; ray-flowers few, ♀, 1-seriate, fertile; disk-flowers ☿, fertile. *Involucre* hemispheric, bracts few, 1–2-seriate, ovate, obtuse, striate. *Receptacle* conic or elongate; paleae slender, serrate. *Corollas* of ♀ flowers ligulate, white, obtuse, the tube with spreading hairs; of ☿ flowers tubular, limb 5-lobed. *Anther*-bases obtuse. *Style*-arms of ♀ spreading obtuse at tip, of ☿ acute, tip short. *Achenes* angled or the outer dorsally compressed, obovate, black, striate, and the inner minutely pubescent; pappus of a few linear scarious fimbriate scales, of ray-flowers 0.

GALINSOGA PARVIFLORA, Cav.; F. B. I. iii. 311.

Hills of the Deccan and W. Ghâts, on roadsides and waste lands, a weed introduced from America.

A glabrous herb with very small flower-heads and ovate 3-nerved membranous leaves.

43. Tridax, Linn.

Perennial herbs. *Leaves* opposite, inciso-dentate or pinnatisect. *Heads* medium-sized, heterogamous, rayed; ray-flowers ♀, fertile, disk-flowers ☿, fertile. *Involucre* campanulate, few-seriate, outer broad, herbaceous, inner scarious. *Receptacle* flat or convex; paleae membranous. *Corolla* of ♀ flowers ligulate or 2-labiate, the outer lip large 3-lobed, the inner small 2-lobed; of ☿ flowers tubular, the limb 2-lobed. *Anther*-bases with short acute auricles. *Style*-arms hairy, the tips subulate. *Achenes* turbinate or oblong, silky; pappus of short or long aristate feathery bristles.

TRIDAX PROCUMBENS, Linn.; F. B. I. iii. 311.

All dry Districts, on roadsides and waste places, introduced from S. America.

A straggling hispid herb with much cut leaves, yellow flowers and achenes with feathery pappus.

44. Flaveria, Juss.

Nearly glabrous herbs. *Leaves* opposite, entire or dentate. *Heads* very small, heterogamous rayed, or homogamous with few ☿ flowers or reduced to 1 flower, ♀ or ☿, all fertile; collected in dense cymes surrounded by floral leaves, the cymes corymbosely paniculate or solitary, terminal, or in the axils of the dichotomous branches. *Involucre* of 2–4 elongate dry folded bracts, with sometimes a few smaller outer ones. *Receptacle* small, naked. *Corollas* of ♀ flowers tubular with a very small ligule; of ☿ flowers tubular, the limb 5-lobed. *Anther*-bases obtuse. *Style*-arms spreading, truncate. *Achenes* oblong, compressed, with 8–10 prominent ribs; pappus 0.

FLAVERIA AUSTRALASICA, Hook.; Benth. Fl. Aust. iii. 546.

Most plains Districts, near the coast or inland, often in muddy places on river banks, introduced from Australia.

A glabrous yellow-flowered herb with dense clusters of heads

frequently 1-flowered (both ♀ or ♂), oblong spathulate dentate leaves and flat ribbed achenes.

45. Cotula, Linn.

Annual or perennial, often creeping, small herbs. *Leaves* alternate, pinnatifid or pinnatisect, rarely entire or toothed. *Heads* small, heterogamous, not rayed, rarely homogamous; outer flowers ♀, 1–2-seriate, inner ♂, all fertile or inner sometimes sterile. *Involucre* hemispheric or campanulate; bracts sub–2-seriate, often with scarious margins. *Receptacle* naked. *Corollas* of ♀ flowers conic or 0, of ♂ flowers tubular, 4-lobed. *Anther*-bases obtuse. *Style*-arms truncate or obtuse, of sterile flowers sometimes entire. *Achenes* of ♀ or of all flowers stipitate, compressed, sometimes sheathed above by the base of the corolla, sometimes with a short auriculate pappus.

COTULA AUSTRALIS, Hook. f.; Fl. N. Z. i. 128.

W. Ghâts, Nilgiris, Pulneys and hills of Travancóre, above 6,000 ft., probably introduced from Australia.

A small erect herb with pinnatifid leaves, small flower-heads on long filiform peduncles, no corollas to the ♀ flowers and achenes of two sorts, those of ray-flowers flat, winged and glandular, those of disk-flowers thick and not winged.

46. Artemisia, Linn.

Herbs or shrubs, usually strong-scented. *Leaves* alternate, entire incised or 1–3-pinnatisect. *Heads* small, heterogamous or homogamous, not rayed, solitary or fascicled, racemose or panicled; outer flowers ♀, 1-seriate, fertile, inner flowers ♂, fertile or sterile. *Involucre* ovoid subglobose or hemispheric, bracts few-seriate, the outer shorter, the margins scarious. *Receptacle* flat or convex, naked or hirsute. *Corollas* of ♀ flowers slender, tubular, shortly 2–3-lobed; of ♂ flowers tubular, the limb 5-lobed. *Anther*-bases obtuse. *Style*-arms of ♀ flowers stout or long and slender, of ♂ shorter and truncate, often penicillate, in sterile flowers often connate. *Achenes* very small, ellipsoid oblong or subobovoid, faintly striate; pappus 0.

Disk-flowers sterile; bracts ovate, glabrous, the margins scarious; lower leaves cuneate, with narrow stipule-like lobes at base, flabel-

lately lobed at apex, deep green on both sides, glabrous or villous, uppermost small, entire..... .....1. *parviflora.*
Disk-flowers fertile; bracts ovate or oblong, softly woolly, the margins scarious; lower leaves ovate in outline, deeply pinnatisect, with small stipule-like lobes at the base, pubescent above, white-tomentose beneath, uppermost small, 3-fid or entire, lanceolate
2. *vulgaris.*

1. ARTEMISIA PARVIFLORA, Buch.-Ham. *ex* Roxb.; F. B. I. iii. 322. *A. glabrata*, DC.; Wt. Ic. t. 1111.
E. Ghâts, hills of Ganjam; W. Ghâts, in Mysore, the Coimbatore Hills, Nilgiris, Pulneys and hills of Travancore, above 3,000 ft.
A shrubby perennial herb.
2. ARTEMISIA VULGARIS, Linn.; F. B. I. iii. 325. *A. indica*, Willd., Wt. Ic. t. 1112.
W. Ghâts, in all Districts, usually at 3,000–6,000 ft., and especially near villages and on old cultivated lands.
A tall aromatic shrub reaching 5–6 ft. high, often gregarious. The leaves of strong shoots are often 5–6 in. long and 3–4 in. broad.

47. Gynura, Cass.

Succulent herbs, rarely undershrubs, glabrous or hispid. *Leaves* alternate, entire toothed or pinnatisect. *Heads* homogamous, not rayed but disciform, solitary or corymbose, bracteolate at the base; flowers all ♂, fertile, or rarely a few outer ♀. *Involucre* cylindric, bracts 1-seriate, narrow, equal, the margins scarious. *Receptacle* flat, pitted or shortly fimbrillate. *Corollas* regular, slender, yellow, tubular; limb slightly enlarged, 5-lobed. *Anther*-bases entire or subauricled. *Style*-arms slender; tips long, subulate, hispid. *Achenes* narrow, many-ribbed; pappus hairs many, soft, white.

Stout herbs with usually more than 5–7 heads in the long-peduncled and branched corymbs:—
Glabrous except below the heads, the stem stout and angular; leaves very variable, obovate or oblanceolate, coarsely and remotely toothed, narrowed or auricled or semi-amplexicaul at base; achenes sparsely hispid between the ribs. .....1. *nitida.*
Hispid in all parts, the stem stout and furrowed; leaves oblong or

oblanceolate, remotely serrate, lower ones narrowed, upper semi-amplexicaul at base; achenes closely brown-hispid
2 *travancorica.*

Slender herbs with usually less than 5–7 heads in the long-peduncled shortly branched corymbs:—

Root not tuberous; leaves deeply and irregularly pinnatifid or lyrate, auricled at base; heads up to about 9, generally less; achenes sparsely hispid between the ribs.....3. *lycopersicifolia.*
Root tuberous; leaves obovate or oblanceolate, entire or more or less deeply sinuately-lobed, the upper cauline only semi-amplexicaul; heads 1–5 usually; achenes villous.....4. *Pseudo-china.*

1. GYNURA NITIDA, DC. in Wt. Contrib. 24; F. B. I. iii. 333; Wt. Ic. t. 1121.
   Hills of the W. Deccan and W. Ghâts, at about 3,000–6,000 ft., in dry open forest.
   A tall fleshy herb with orange flowers.
2. GYNURA TRAVANCORICA, W. W. Smith in Rec. Bot. Surv. Ind. vi. 29.
   W. Ghâts, Pulney Hills and hills of Travancore, at 5,000–6,000 ft.
   A tall, very hispid herb with yellow flowers.
3. GYNURA LYCOPERSICIFOLIA, DC.; F. B. I. iii. 334.
   N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft. (Fischer); W. Deccan, in Mysore and N. Coimbatore; W. Ghâts, Nilgiri Hills (C. B. Clarke), at low levels, 1,500–4,000 ft., hills of Tinnevelly, usually on river banks in evergreen forests.
   A slender erect herb with yellow flowers.
4. GYNURA PSEUDO-CHINA, DC.; F. B. I. iii. 334.
   W. Ghâts, Courtallum in Tinnevelly (Wight); hills of Travancore.
   A short-stemmed tuberous-rooted herb.

48. Emilia, Cass.

Annual or perennial herbs, often glaucous, glabrous or with usually crispate pubescence. *Leaves* alternate, entire toothed or lyrate-pinnatifid, usually auricled and semi-amplexicaul, sometimes simply linear. ***Heads*** homogamous, not rayed, all discoid and ♂♀, fertile, solitary or in loose corymbs with long peduncles;

no bracteoles. *Involucre* cylindric; bracts uniseriate, equal, free or cohering, reflexed in fruit. *Receptacle* flat, naked. *Corollas* slender, tubular, limb dilated, purple or red, lobes 5. *Anther*-bases obtuse or very minutely tailed. *Style*-arms subterete, the hairy tip short and obtuse or long and acute. *Achenes* subterete or angled and 5-ribbed, glabrous pubescent or scabrid on the angles; pappus copious, white, soft, minutely hairy.

Leaves chiefly radical or for a short way up the stems, lyrate, prominently crenate, especially the rounded end lobe, crispately pubescent, 1–2 in. long; heads large, many-flowered, ·5 in. long, the bracts ·3 in.; corolla-lobes ·1 in. long; style-arms truncate with a minute tip; achenes hispid on the angles ..... 1. *scabra*.

Leaves both radical and cauline, the upper cauline only much reduced:—

Heads small, under ·5 in. long, few-flowered, the bracts as long, peduncles and often umbellate pedicels long, slender and spreading; leaves and stems soft, fistular, glaucous, glabrous or nearly so, the leaves lyrate-pinnatifid with large terminal lobe, up to 5 in. long, the basal leaves petioled, cauline acutely auricled; corolla-lobes very short; style-arms short with acute tip; achenes hispid on the angles ..... 2. *sonchifolia*.

Heads large, ·5 in. long or longer, many-flowered, longer than the bracts; radical leaves few, lower cauline many:—

Stout and almost subshrubby with thick roots and almost distichous leaves, radical only lyrate, cauline ovate or obovate, acute, deeply sagittately auricled, glabrous or crispate-pubescent, entire to crenate on the margins; corolla-lobes ·1 in. long; style-arms long with conical tip; achenes hispid on the angles, pubescent between them ..... 3. *flammea*.

Slender, erect, glabrous herbs, leaves narrow and linear-oblong, with deep sagittate basal auricles, the tips sometimes hooked; corolla-lobes ·1 in. long; style-arms long with small conical tip; achenes white-hispid on the angles or nearly glabrous 4. *zeylanica*.

Leaves all cauline and subsimilar, narrow and nearly or quite entire, linear-oblong or spathulate, glabrous above, softly crispate-hirsute beneath, the margins recurved, up to 2·5 in. long, ·5 in. broad, obtuse at apex, narrowed at base with minute auricles; heads large, many-flowered, usually solitary on long peduncles; corolla-lobes ·1 in. long, pubescent at tip; style-arms short with short tip; achenes hispid on the angles ..... 5. *ramulosa*.

1. EMILIA SCABRA. DC.; Wt. Ic. t. 1123. *E. sonchifolia* var. *scabra*, Hook. f.; F. B. I. iii. 336.
   Hills of N. Circars; W. Ghâts, above 5,000 ft., sometimes on rocks at high levels.
   A short crispately pubescent herb with bright red flowers.
2. EMILIA SONCHIFOLIA, DC.; F. B. I. iii. 336.
   All Districts in the plains, and up to 4,000 ft. in the hills, common and often found in rice-fields.
   A soft straggling herb with purplish flowers.
3. EMILIA FLAMMEA, Cass.; F. B. I. iii. 336.
   Deccan, hills of N. Coimbatore, at 4,000 ft.; W. Ghâts, Bababudan Hills of Mysore, Nilgiris, Anamalais and Pulneys, above 6,000 ft., wide-spread and apparently wild, but probably an escape.
   A stout, almost shrubby tall herb with scarlet flowers and very leafy branches.
4. EMILIA ZEYLANICA, C. B. Clarke; F. B. I. iii. 336.
   W. Ghâts, Pulney Hills and hills of Travancore and Tinnevelly, above 4,000 ft.
   A slender plant with narrow auricled leaves, said to have purple flowers.

Var. *paludosa*, Gamble.
   W. Ghâts, lake-swamps and wet places in the Pulney Hills, above 6,000 ft. (Bourne).
   A slender water-plant with purple flowers and very narrow leaves, of which few or none radical, the tips hooked, the heads few-flowered.

5. EMILIA RAMULOSA, Gamble in Kew Bull. 1921, ined.
   W. Ghâts, Anamalai Hills (Fischer), hills of Travancore and Tinnevelly, above 5,000 ft. (Beddome, Barber, Rangachari).
   A wiry subshrubby branching herb.

49. Notonia, DC.

Undershrubs, glabrous and more or less fleshy. *Leaves* alternate, obovate or lanceolate, entire or serrate. *Heads* large, homogamous, not rayed, all ♀, fertile, in long-peduncled corymbs; bracteolate or not. *Involucre* cylindric; bracts uniseriate, equal. *Receptacle* flat, naked. *Corollas* tubular, slender;

limb elongate, cylindric, shortly 5-lobed. *Anther*-bases entire. *Style*-arms elongate, tips short, ovate, papillose or hispid. *Achenes* long, subterete, 10-striate; pappus-hairs copious, white, slender, barbellate.

Stems and leaves fleshy; leaves obovate or oblanceolate or suborbicular, obtuse, variable in size but sometimes reaching 8 in. long, 4 in. broad, quite entire, glaucous-green; heads ·75–1·25 in. long, the bracts ·5–·75 in. long, broad; corolla-tube slender, ·5–·7 in. long; achenes glabrous ..... 1. *grandiflora.*
Stems and leaves soft and slightly fleshy; leaves long-petioled, oblong-lanceolate, acuminate, reaching 8 in. long, 2–3 in. broad, serrate or crenate; heads ·5–·6 in. long, the bracts as long, narrow; corolla-tube slender, ·3 in. long; achenes sparsely hairy ... 2. *Walkeri.*

1. NOTONIA GRANDIFLORA, DC.; F. B. I. iii. 337. *N. corymbosa.* DC.; Wt. Ic. t. 484.
   Hills of the S. Deccan and Carnatic from Nellore and Cuddapah southwards, westwards to the E. slopes of the W. Ghâts in Nilgiris, Pulneys and hills of Tinnevelly up to 5,000 ft.
   A fleshy shrub reaching 5 ft. in height, with pale yellow flowers turning green. It is probable that in dry hot places the heads are few, in damper localities they are often in rather large corymbs (*N. corymbosa*, DC.). A Courtallum form has much thicker stems and nearly orbicular leaves.
2. NOTONIA WALKERI, C. B. Clarke; F. B. I. iii. 337. *Gynura Walkeri*, Wt. Ic. t. 1122.
   W. Ghâts, Nilgiris, in Shola forests above 7,000 ft.
   A tall shrubby plant reaching 7 ft. in height, with large corymbs of yellowish-white flowers.

50. Senecio, Linn.

Herbs, undershrubs or shrubs. *Leaves* radical or alternate, entire or variously divided. *Heads* heterogamous rayed, or sometimes homogamous not rayed, usually yellow, solitary corymbose or recurved; ray-flowers ♀, fertile or neuter, disk-flowers ♂, fertile. *Involucre* of 1-seriate or nearly 2-seriate equal erect bracts, free or connate at the base, usually with short bracteoles below them. *Receptacle* flat or convex, naked, pitted

or fimbrillate. *Corollas* of ♀ flowers tubular below, ending in spreading ligules, which are sometimes small but usually large and prominently ribbed; of ♂ tubular, with a 5-fid campanulate limb. *Anther*-bases obtuse or auricled or minutely tailed. *Style*-arms of ♂ flowers recurved, the tips truncate or penicillate or shortly pointed. *Achenes* subterete or those of outer flowers compressed, 5–10-ribbed; pappus copious or not, usually soft and white, smooth scabrid or barbellate.

Erect herbs, all with yellow flowers:—

Ligules none; soft weed with pinnatifid glabrous leaves and small heads with soft white pappus and yellow flowers.....*vulgaris.*

Ligules present and usually conspicuous, yellow:—

All flowers, both ♀ ray and ♂ disk, with pappus to the achenes and fertile; heads in corymbs with small bracteoles at the base of the involucre and on the ultimate branches:—

Corymbs lax, spreading, with long peduncles and its branches; leaves distant, long:—

Pappus sordid; radical leaves rosulate, obovate obovate-oblong or spathulate, crenate, subpinnatifid or subentire; cauline linear-oblong or spathulate, lobulate, auricled at base, up to 7 in. long, 1–1·5 in. broad; bracts lanceolate, 10–14, acute, 3-nerved; achenes villous or puberulous

1. *nudicaulis.*

Pappus white:—

Leaves long, narrow, linear, entire or obscurely toothed, glabrous or puberulous beneath, sometimes cottony, up to 6 in. long, ·4 in. broad; bracts 16–20, linear, 1-3-nerved, ciliate at tip; achenes 10-ribbed, minutely scabrid on the ribs ..... .2. *zeylanicus.*

Leaves linear-oblong, lower often spathulate, cauline auricled and semi-amplexicaul, margins from nearly entire to almost pinnatifid, glabrous pubescent or even white-cottony beneath, up to 5 in. long; bracts 20 or more, narrow with a thickened rib, penicillate at tip; achenes ribbed, glabrous or very minutely papillose

3. *neelgherryanus.*

Corymbs close, very bracteolate; leaves short, all cauline and with strongly recurved margins; achenes ribbed, glabrous:—

Leaves closely imbricate on the stem, conspicuously so near the middle, linear-oblong, 1 in. long, hispidly villous, the margins recurved; corymbs close with up to about 25 heads;

bracts about 20, lanceolate, acuminate, scarious on the margins, ciliate at tip; ligules 4-nerved...4. *lavandulaefolius*.
Leaves scattered along the stem regularly from base to inflorescence, linear, up to ·7 in. long, villous only on the midrib; corymbs somewhat lax with only 1–6 heads; bracts about 20, linear, acuminate, scarious on the margins; ligules 5–7-nerved ..... 5. *Lawsoni*.

Ray-flowers ♀ without pappus to the achenes, usually sterile, disk-flowers ♂ with pappus, fertile; heads with bracteoles below the involucre and on the pedicels:—

Leaves not white and cottony beneath:—

Leaves entire, serrate, often deeply, but not pinnatifid:—

Basal leaves petioled, oblanceolate or spathulate, cauline sessile, lanceolate from an amplexicaul base, all regularly shortly dentate, glabrous, 2–3·5 in. long, ·5 in. broad; heads small, 5 in. broad, the ligules about 7-nerved; bracts narrow, glabrous; achenes striate, glabrous; pappus sordid.....6. *Wightii*.

Basal leaves almost rosulate, large, cauline small; all leaves sessile, elliptic-oblong or oblanceolate, crenate, strigosely villous, with 3–7 prominent oblique nerves, up to 3 in. long, 1 in. broad; heads ·5–·7 in. broad, the ligules about 6-nerved; bracts narrow, glabrous except the tip; achenes striate, glabrous; pappus yellow...7. *polycephalus*.

Leaves all cauline, uppermost only smaller, lower dense on stem, sessile, hispid-pubescent, elliptic or oblong, deeply serrate, base auricled and amplexicaul, up to 2 in. long, ·7 in. broad, nerves oblique but not prominent; heads ·6–·8 in. broad, the ligules broad, 9-nerved; bracts narrow, acuminate, hispid; achenes very villous; pappus rufous ..... 8. *Lessingianus*.

Leaves pinnatifid:—

Leaves lyrate, with broadly ovate or orbicular end lobe, smaller lower lobes and broadly auricled basal one, all lobulate, hispid-pubescent, about 2·5 in. long, 1·5 in. broad; heads ·5 in. broad, the ligules 4-nerved; bracts narrow, acuminate, glabrous or crispate; achenes all similar, 5-angled, nearly glabrous; pappus sordid 9. *ludens*.

Leaves deeply pinnatifid or bipinnatifid with narrow segments; achenes of ray flowers sterile, glabrous or slightly villous, of disk-flowers hispid or villous:—

Leaves deeply pinnatifid with about 3 pairs of

mucronate side lobes, rarely over 1 in. long, usually thickly crispate-hispid, margins reflexed; heads ·8 in. broad, the 8 ligules 4-nerved; bracts 10–15, lanceolate, acuminate, crispate-hispid; pappus yellow
10. *Hohenackeri.*

Leaves pinnatifid or bipinnatifid with many lobes not mucronate, up to 2 in. long, glabrous or nearly so, margins often reflexed; heads small, about ·4 in. broad, the 6–10 ligules 4-nerved; bracts about 12, obovate, cuspidate, glabrous except the ciliate tips; pappus yellowish ..... 11. *tenuifolius.*

Leaves white beneath with cottony tomentum:—

Leaves pale and cottony above, densely white-tomentose beneath, rhomboid or ovate-lanceolate irregularly toothed, the petiole auricled, up to 2 in. long, ·75 in. broad; heads nearly 1 in. in diam., the ligules about 12, long and narrow, 4-nerved; bracts 20 or more, lanceolate, acuminate, scarious on the margins; achenes angled, shortly pilose; pappus soft, white .... 12. *Edgeworthii.*

Leaves glabrous above, cottony beneath, linear-oblong, the margins recurved, up to 2 in. long, ·25 in. broad; heads about ·5 in. in diam., the ligules 10–15, narrow, 4-nerved; bracts 10–20, narrow, hardened, back strigosely villous; achenes small, scabrid-villous; pappus white, rigid, feathery
13. *Dalzellii.*

Climbing shrubs or undershrubs; achenes with pappus:—

No ligulate flowers, all ♂; leaves orbicular or ovate, cordate, 3–5-ribbed from the base:—

Leaves pubescent and slightly cottony when young, afterwards glabrous, rather abruptly acuminate at apex; heads ·4 in long, with about 9–12 flowers; bracts 8, linear-obovate, nearly glabrous, the apex ciliate.....14. *Walkeri.*

Leaves densely cinnamomeous-tomentose beneath, gradually acuminate at apex; heads ·5 in. long with about 5–15 flowers; bracts 8, oblong-lanceolate, cottony on the back...15. *corymbosus.*

Ligulate flowers present; ligules yellow:—

Leaves long-petioled, membranous, ovate, cordate, sinuate-dentate, glabrous above, densely white cottony tomentose beneath, 5–7-ribbed; heads large, about 1 in. in diam., ligules obovate, 5-nerved; bracts many, unequal, membranous, densely white-cottony on the back; achenes oblong, ribbed
16. *calcadensis.*

Leaves with hastate or cordate terminal leaflets, base with reniform stipulate auricles, sometimes a few small intermediate lobes; stems angled and flexuose, even zigzag; heads yellow, in terminal and axillary divaricately branched corymbs; achenes of ♂ flowers linear, 4-5-ribbed, scabrid on the ribs:—

Stem, leaves and inflorescence, including bracts, white-cottony tomentose; leaves up to 3·5 in. long, 1 in. broad, coriaceous, dentate, the auricle large and rounded; heads ·5 in. in diam., many-flowered; achenes of ♂ flowers broadly oblong, glabrous but ciliate, deeply 2-3-furrowed on back, the inner face with a bifid rib ..... 17. *candicans.*

Stem, leaves and inflorescence, including bracts, glabrous or nearly so; achenes of ♀ flowers flattened, narrow, the inner face with a slight rib, nearly glabrous:—

Leaves ovate, dentate, membranous, slightly crispate-villous beneath, up to 4 in. long, 2 in. broad, the auricle large, rounded; heads ·5 in. in diam., many-flowered; ligules about 12 ..... 18. *intermedius.*

Leaves lanceolate or ovate, dentate, membranous, up to 3 in. long, 1 in. broad, the auricle minute or absent; heads ·3 in. in diam., few-flowered; ligules about 8

19. *Wightianus.*

1. SENECIO NUDICAULIS, Buch.-Ham. in Don Prodr. 179, F. B. I. iii. 340.

   Hills of N. Circars from Ganjam to the Godavari, above 3,000 ft. (W. Elliot, Gamble).

   A scapigerous "Ragwort."

2. SENECIO ZEYLANICUS, DC.; F. B. I. iii. 340.

   W. Ghâts, in the Pulney Hills and hills of Travancore, in wet places above 5,000 ft.

   A slender very narrowly-leaved herb.

3. SENECIO NEELGHERRYANUS, DC. in Wt. Contrib. 23; F. B. I. 341; Wt. Ic. t. 1132.

   W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft., in Shola forest margins.

   The Nilgiri "Ragwort." A Kundahs form has the leaves very white cottony beneath.

4. SENECIO LAVANDULAEFOLIUS, DC. in Wt. Contrib. 23; F. B. I. iii. 343; Wt. Ic. t. 1133.

   W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft., on the downs.

An erect single-stemmed herb, about 6 in. to 1 ft. high, the closely set leaves giving the stem a spindle shape.

5. SENECIO LAWSONI, Gamble in Kew Bull. 1920, 342.
W. Ghâts, Nilgiri Kundahs about 7,500 ft., on grassy downs between Avalanché and Sispara (Lawson, Gamble).
A very slender herb about 12–15 in. high.

6. SENECIO WIGHTII, Benth. *S. saxatilis*, Hook. f.; F. B. I. iii. 344, *not of* Wall. *Doronicum Wightii*, DC.; Wt. Ic. t. 1124.
W. Ghâts, Nilgiri Hills above 6,000 ft. in wet places; Chikanhalli in Mysore, at 3,000 ft. (Meebold).
The swamp Ragwort, the heads in long-peduncled lax corymbs.

7. SENECIO POLYCEPHALUS, C. B. Clarke; F. B. I. iii. 344. *Doronicum Arnottii*, DC.; Wt. Ic. t. 1125.
W. Ghâts, Nilgiri Hills, above 6,000 ft., on the downs.
A pretty species with scapose habit and rather few heads.

8. SENECIO LESSINGIANUS, C. B. Clarke; F. B. I. iii. 344. *Doronicum Lessingianum*, W. & A.; Wt. Ic. t. 1126.
W. Ghâts, Nilgiri Hills, above 6,000 ft.
A handsome species with leafy stems and few large heads on long peduncles.

9. SENECIO LUDENS, C. B. Clarke; F. B. I. iii. 345.
Bababudan Hills of Mysore at 5,000 ft., usually in damp places; hills of Travancore and Tinnevelly in grass land.
A slender erect herb, with bright yellow flowers in few-flowered corymbs.

10. SENECIO HOHENACKERI, Hook. f.; F. B. I. iii. 345. *Doronicum Candolleanum*, W. & A.; Wt. Ic. t. 1127.
W. Ghâts, Nilgiri Hills at 5,000–7,000 ft., on open downs.
A branching small undershrub up to about 18 in. high with woody rootstock.

Var. *rupestris*, Gamble. *Doronicum rupestre*, Wt. Ic. t. 1128.
Sivagiri Hills of Tinnevelly, in clefts of rocks.
A smaller plant with narrower less hispid leaves and larger flower-heads and ligules.

11. SENECIO TENUIFOLIUS, Burm. f. Fl. Ind. 181 t. 60, fig. 4; F. B. I. iii. 345. *Doronicum tenuifolium*, Wt. Ic. t. 1129.
Deccan and Carnatic, in most dry Districts south of the Kistna, westwards to the E. slopes of the Ghâts, up to 5,000 ft.

A slender much-branched annual with leaves cut into very narrow lobes, the achenes white-villous.

12. SENECIO EDGEWORTHII, Hook. f.; F. B. I. iii 346. *Doronicum tomentosum*, Wt. Ic. t. 1151 A.

W. Deccan, hills of N. Coimbatore at 4,000–5,000 ft.; W Ghâts from S. Canara to Wynaad and W. Nilgiris, at 5,000 ft.

An erect very white undershrub, the corymbs with few heads.

13. SENECIO DALZELLII, C. B. Clarke; F. B. I. iii. 346.

Bababudan hills of Mysore (Law).

An erect herb with small heads on slender peduncles.

14. SENECIO WALKERI, Arn. Pug. 31; Wt. Ic. t. 1131. *S. araneosus*, DC.; F. B. I. iii. 351.

W. Ghâts, Pulney Hills up to 7,000 ft., scarce in Nilgiris.

A rather slender climber with heads in corymbose clusters on the branches of axillary and terminal panicles; flowers reddish (?).

15. SENECIO CORYMBOSUS, Wall.; F. B. I. iii. 351; Wt. Ic. t. 1130, Ill. t. 115.

N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft. (Beddome, Gamble); W. Ghâts, from the Nilgiris southwards, above 5,000 ft.

A stouter plant than the former, to which it is very similar except in tomentum.

Flowers white or yellowish, the heads on terminal branchlets often few-flowered and in laxer corymbs.

16. SENECIO CALCADENSIS, Ramas. in Rec. Bot. Surv. Ind. vi. 138, t. 1.

W. Ghâts, Calcad Hills of Tinnevelly, at about 2,500 ft. (Hooper and Ramaswami), in evergreen forest.

A large climbing shrub with light yellow flowers.

17. SENECIO CANDICANS, DC.; F. B. I. iii. 352; Wt. Ic. t. 1134.

N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft.; Deccan, Nandidrúg in Mysore; W. Ghâts, Nilgiri Hills, above 4,000 ft.

A pretty subshrubby climber, white-woolly and conspicuous; the ♀ achenes very characteristic.

18. SENECIO INTERMEDIUS, Wt. Ic. t. 1135. *S. scandens*, Hook. f.; F. B. I. iii. 352, *not of* Buch.-Ham. in D. Don Prod., *in part*.

Deccan, Bababudan Hills of Mysore, hills of N. Coimbatore at 4,000–6,000 ft.; W. Ghâts, Nilgiri Hills, in the Kundahs at 7,000 ft.

A pretty climber, subshrubby among bushes, with rather large leaves and prominent auricles.

19. SENECIO WIGHTIANUS, DC.; Wt. Ic. t. 1136. *S. scandens*, Hook. f.; F. B. I. iii. 352 *in part.*

W. Ghâts, Pulney Hills and hills of Travancore about 4,000 ft.

A slender climber with zig-zag stems and rather small flower-heads, the leaves sometimes pinnate or pinnatifid.

Senecio vulgaris, Linn., the Groundsel, has established itself in gardens and on roadsides in the Nilgiris and will probably spread to other hilly parts of S. India.

51. Echinops, Linn.

Thistle-like herbs with white tomentum. *Leaves* alternate, pinnatifid, spinous. *Heads* in globose involucrate clusters, white or blue, sessile or shortly stipitate on a common receptacle, 1-flowered. Flowers ♂, all fertile. *Involucre* oblong; bracts many-seriate, rigid, pungent or some spinescent, outer shorter often hair-like, middle ones spathulate, inner linear or lanceolate, sometimes connate in a tube with 1 rigid spine. *Receptacle* minute. *Corolla*-tube slender, limb with 5 slender lobes. *Anther*-bases sagittate, the auricles connate, tails entire or fimbriate. *Style*-arms thick, with a thick basal ring, at length spreading. *Achenes* elongate, villous; pappus of many short, free or connate, bristles.

ECHINOPS ECHINATUS, DC.; F. B. I. iii. 358.

N. Circars, Deccan and Carnatic, in dry Districts, in fields, grass lands and open forests and on roadsides.

A branched spreading conspicuous annual with spinous heads up to 2 in. in diam., the flowers white, the leaves up to 7 in. long with triangular pinnatifid spinous lobes.

52. Cnicus, Linn.

Erect, simple or branching thistles. *Leaves* alternate, often decurrent, serrate or pinnatifid, spinous. *Heads* solitary, peduncled or subsessile, scattered or crowded, homogamous, flowers all ♀ and fertile, rarely dioecious. *Involucre* ovoid

hemispheric or globose; bracts many-seriate, appressed, erect spreading or recurved and spinescent, outer foliaceous. *Receptacle* flat or convex, densely bristly. *Corollas* white yellow or red, slenderly tubular, the limb with 5 slender lobes. *Anther*-bases sagittate, the auricles connate, tails slender. *Style*-arms short, obtuse. *Achenes* obovoid, obtusely 4-angled, smooth or 5–10-ribbed, truncate or umbonate at top; pappus copious, feathery, the longer hairs usually clavellate.

CNICUS WALLICHII, Hook. f.; F. B. I. iii. 363. Var. *Wightii*, Hook. f. *Cirsium argyracanthum*, Wt. Ic. t. 1137–8.

W. Ghâts, Nilgiri and Pulney Hills and hills of Travancore, above 5,000 ft., on open downs.

A tall thistle with very spinous leaves, glabrous or white-tomentose beneath, bracts with dilated and then spinous tips and pale purple flowers. It may reach a height of 6–7 ft.

53. Goniocaulon, Cass.

An erect glabrous branched annual, stem acutely 4–8-angled. *Leaves* alternate, oblong, serrate, glandular-dotted. *Heads* homogamous, narrow, in fascicles and corymbs; flowers all ♀, fertile. *Involucre* oblong from a narrow base; bracts many-seriate, pale, narrow, rigid, not spinous, the inner elongate, the outer gradually shorter. *Receptacle* very narrow, paleaceous *Corolla*-tube slender, limb long, cylindric, 5-lobed to the middle or lower, the lobes narrow. *Anther*-bases sagittate, connate, shortly tailed, tips long; filaments hairy. *Style*-arms filiform. *Achenes* glabrous, oblong, subcylindric, about 20-ribbed; pappus paleaceous, the scales many-seriate, oblanceolate, unequal.

GONIOCAULON GLABRUM, Cass.; F. B. I. iii. 377. *Amberboa indica*, Wt. Ic. t. 479.

Deccan and Carnatic, on fallow fields and black cotton soil, often gregarious and simulating a cultivated crop.

An erect annual with rose-coloured flowers and oblong leaves.

54. Tricholepis, DC.

Annual or perennial branched herbs. *Leaves* alternate, entire toothed or sublyrate, often punctate. *Heads* terminal on the

branchlets, homogamous, flowers all ♂, fertile. *Involucre* ovoid; bracts many-seriate, very narrow, imbricate, the outer gradually shorter, all aristate-acuminate or the outer mucronate, spreading or recurved. *Receptacle* flat or convex, densely bristly. *Corollas* yellow red or purple, regular or slightly oblique; tube slender, limb 5-lobed to the middle. *Anther*-bases sagittate, the auricles connate, tails slender, lacerate; filaments papillose-hairy. *Style*-arms slender. *Achenes* oblong or obovoid, smooth, ribbed, the basal areole lateral and hollowed; pappus of stiff, paleaceous or feathery, very unequal scales or 0.

Pappus-scales many, achenes oblong: —

Stems prominently leafy; basal leaves obovate, cauline oblong, sometimes spathulate, all coarsely toothed, the teeth mucronate, the bases semi-amplexicaul, up to 2·5 in. long, 1 in. broad; pappus scales subpaleaceous, serrulate.....1. *radicans.*

Stems sparsely leafy; leaves all linear-oblong, shortly mucronate-serrate, the bases auricled, up to 4 in. long, ·5 in. broad; pappus scales soft feathery.....2. *glaberrima.*

Pappus-scales few, minute or 0; achenes ovoid or oblong with circular apical areole; leaves distant except at base, linear-oblong or -lanceolate, the basal spathulate, sharply mucronate-serrate, up to 3 in. long, the lower to 1 in. broad, the cauline very narrow

3. *angustifolia.*

Pappus-scales 0; achenes obovoid with only a small apical areole; stems leafy, leaves oblong, semi-amplexicaul and auricled at base, shortly sharply serrate, up to 5 in. long, 1·5 in. broad

4. *amplexicaulis.*

1. TRICHOLEPIS RADICANS, DC.; F. B. I. iii. 381.

Deccan and Carnatic, up to 3,500 ft. in the hills, on fallow fields and in open forest land.

A slender branching herb with purple flowers and angular stem.

2. TRICHOLEPIS GLABERRIMA, DC.; F. B. I. iii. 381.

W. Ghâts, in S. Canara, Coorg and the hills of Mysore.

An erect glabrous herb with purple flowers and angular stem.

3. TRICHOLEPIS ANGUSTIFOLIA, DC.; F. B. I. iii. 382.

W. Coast, in S. Canara, Malabar and Travancore.

An erect herb with long slender angular branches and pink flowers in solitary heads.

4. TRICHOLEPIS AMPLEXICAULIS, C. B. Clarke; F. B. I. iii. 381.

W. Coast in Canara (South ?) (Law).

A tall erect leafy herb reaching 5 ft. in height with purple flowers in many heads, the stems ribbed and sometimes scaberulous.

55. Volutarella, Cass.

Annual herbs, dichotomously branched. *Leaves* alternate, entire toothed or pinnatifid. *Heads* subsolitary, heterogamous; outer flowers 1-seriate, neuter; disk-flowers ♂, fertile. *Involucre* ovoid or globose; bracts many-seriate, the innermost narrow, acute, the outer shorter, awned or spinescent. *Receptacle* flat, densely bristly. *Corollas* regular, purple violet or blue; tube slender, limb cylindric, deeply 5-lobed. *Anther*-tails sagittate, the auricles connate, shortly tailed. *Style*-arms free or connate, hairy below them. *Achenes* obovoid or oblong, subterete or angled, ribbed, often pitted between the ribs, the basal areole oblique or lateral; pappus of many unequal bristles, the innermost 2–4 long, dilated and flattened, the outer gradually shorter.

VOLUTARELLA DIVARICATA, Benth.; F. B. I. iii. 383. *Tricholepis procumbens*, Wt. Ic. t. 1139.

Circars, Deccan and Carnatic, up to 2,000 ft., on dry stony ground and sandy river banks.

A stiff straggling herb with pale purple flowers and usually oblong or obovate pinnatifid undulately lobed leaves. The spinous bracts are rather troublesome.

Carthamus tinctorius, Linn., the Safflower, is not much cultivated in Madras, but is found here and there, especially on black cotton soil. The corollas of the flowers are used as a dye for silks and the achenes give an oil. Vern. *Hind.* Kusam; *Tel.* Kusamba; *Tam.* Sendurkem.

56. Dicoma, Cass.

Herbs or low shrubs. *Leaves* alternate. *Heads* subsessile on the branches or in the axils of the upper leaves, or leaf-opposed, rarely corymbose; homogamous and discoid with all the flowers ♂ or heterogamous with the outer flowers ♀, all fertile or the innermost sterile. *Involucre* globose conic or subcampanulate;

bracts many-seriate, imbricate, ovate lanceolate or linear, acuminate or spinescent, outer shorter. *Receptacle* flat, naked, often pitted. *Corollas* of ♀ flowers, if present, slender, subligulate, of ♂ flowers tubular, the limb 5-lobed, the lobes erect or revolute. *Anther*-bases sagittate, tails long, more or less bearded. *Style*-arms short, erect, obtuse. *Achenes* turbinate, densely silky-villous, 5–10-ribbed; pappus-hairs many-seriate, feathery, the inner or all flat, the outer paleaceous or of slender bristles.

DICOMA TOMENTOSA, Cass.; F. B. I. iii. 387. *D. lanuginosa*, DC.; Wt. Ic. t. 1140.

Deccan and Carnatic, on gravelly soils and laterite, in dry country.

An erect branching undershrub with white or pale yellow corollas, the leaves soft, linear or linear-obovate, densely white-tomentose, the heads subaxillary, spinescent.

57. Picris, Linn.

Erect branched hispid herbs. *Leaves* alternate or radical, entire toothed or pinnatifid. *Heads* terminal on the branches of a corymb or solitary, long-peduncled, homogamous. *Involucre* subureeolate or campanulate: inner bracts 1-seriate, subequal, outer many-seriate, herbaceous, or the outermost broad and foliaceous. *Receptacle* flat, naked. *Corollas* yellow, ligules truncate, 5-toothed. *Anther*-bases sagittate, acute or shortly setaceous. *Style*-arms slender. *Achenes* narrow, incurved, glabrous, compressed or angled, 5–10-ribbed, the spaces between the ribs transversely barred, all similar or the outer with a shorter point and obsolete pappus; pappus usually copious, with one series of feathery soft hairs.

PICRIS HIERACIOIDES, Linn.; F. B. I. iii. 393; Wt. Ic. t. 1143.

W. Ghâts, Nilgiri and Pulney Hills, above 5,000 ft.

An erect coarse herb reaching 4 ft. in height, with rough hispid stem, spathulate petioled base and oblong sessile cauline leaves, the bracts with stiff black hairs down the midrib.

58. Hypochaeris, Linn.

Annual or perennial scapigerous herbs. *Leaves* rosulate, entire toothed or pinnatifid. *Heads* long-peduncled, solitary, homo-

gamous. *Involucre* subcampanulate; bracts many-seriate, appressed, unequal, the outer shorter. *Receptacle* flat; paleae narrow, usually hyaline. *Corollas* yellow, ligules truncate, 5-toothed. *Anther*-bases sagittate, auricles acuminate. *Style*-arms slender, slightly obtuse. *Achenes* of two kinds, the outer truncate at tip, not beaked, the inner fusiform and long-beaked, all 10-ribbed and transversely barred between the ribs; pappus feathery, 1-seriate with a few shorter outer hairs.

HYPOCHAERIS GLABRA, Linn.; F. B. I. iii. 401.

W. Ghâts, Nilgiri and Pulney Hills above 6,000 ft., an introduced European species now run wild; Devicolam, Travancore, 4,500 ft. (K. Venkoba Row).

A scapigerous herb with many slender flowering stems and rosettes of oblong or pinnatifid leaves reaching 6 in. long.

59. Crepis, Linn.

Annual or perennial herbs. *Leaves* radical or alternate, cauline often amplexicaul, entire toothed or pinnatifid. *Heads* peduncled, solitary fascicled or corymbose, homogamous. *Involucre* cylindric or campanulate; bracts either many-seriate and imbricate, or 1-seriate with some shorter and outer, base or midrib sometimes thickened after flowering. *Receptacle* flat, naked or shortly fimbrillate. *Corollas* yellow or red; ligules truncate, 5-toothed. *Anther*-bases sagittate, auricles acute. *Style*-arms slender. *Achenes* more or less fusiform or oblong, rarely short and cylindric, ribbed, glabrous or scaberulous, the tip narrowed or beaked; pappus copious, short or long, of simple, soft silvery, rarely brownish and stiff, hairs.

Heads very small, scarcely ·2 in. long, few-, about 14-flowered, in slender nearly leafless corymbs from a rosulate base; leaves membranous, petioled, obovate, sinuate-toothed or runcinate-pinnatifid, up to 7 in. long; inner bracts lanceolate acuminate, the midrib thickened in fruit, outer minute; achenes very small, fusiform, ribbed, scaberulous, very shortly beaked.....1. *japonica.*

Heads about ·3 in. long, about 14-flowered in slender scanty corymbs; leaves membranous, both basal and cauline, oblanceolate, acuminate, sinuate-toothed, up to 6 in. long; inner bracts linear, glabrous, the midrib not enlarged in fruit, outer short; achenes narrowly fusiform, ribbed, scaberulous, shortly beaked, 1 or 2 outer more slender and with longer beaks.....2. *fuscipappa.*

Heads ·5 in. long, few-, about 12-flowered, in almost leafless scapes from a rosulate base; leaves thick, linear-lanceolate or -oblong, entire or shortly-toothed, narrow, up to 12 in. long; inner bracts few, linear, membranous, outer short, ovate; achenes fusiform, ribbed, glabrous, very shortly beaked.....3. *acaulis*.

1. CREPIS JAPONICA, Benth.; F. B. I. iii. 395. *Youngia napifolia*, Wt. Ic. t. 1147.
   N. Circars, hills of Ganjam; W. Ghâts, Nilgiris, Pulneys and hills of Travancore and Tinnevelly above 5,000 ft.
   A very slender annual with minute yellow flowers.
2. CREPIS FUSCIPAPPA, Benth.; F. B. I. iii. 395.
   W. Ghâts, Avalanché and Sispara, Nilgiris, about 7,000 ft. (Lawson, Gamble).
   A slender annual with yellow flowers and long-acuminate leaves.
3. CREPIS ACAULIS, Hook. f.; F. B. I. iii. 396. *Microrhynchus glabra*, Wt. Ic. t. 1145.
   N. Circars, hills of Ganjam, up to 4,500 ft. on Mahendragiri (Fischer and Gage); W. Ghâts, Nilgiri and Pulney Hills, at various levels.
   A scapigerous perennial with yellow flowers in cylindric heads.

60. Lactuca, Linn.

Glabrous or hispid milky herbs. *Leaves* radical and alternate, entire toothed pinnatifid or pinnate, cauline often amplexicaul and auricled. *Heads* homogamous, sessile or peduncled, panicled corymbose racemose or spicate. *Involucre* cylindric, usually narrow; bracts usually few-seriate, thinly herbaceous, the inner elongate, the outer short. *Receptacle* flat, naked. *Corollas* yellow pink or blue; ligules truncate, 5-toothed at apex. *Anther*-bases sagittate, auricles acute or setaceous. *Style*-arms slender. *Achenes* ovoid-oblong or narrow, compressed or flattened, beaked; the faces ribbed, smooth or rugose; beak slender or short and cylindric, dilated into the pappiferous disk; pappus copious, the hairs very slender and usually soft and white, sometimes with a minute outer ring.

Glabrous herb with mostly radical leaves and heads in spikes or racemes on the long erect almost naked branches of the flowering

stems; leaves runcinate-pinnatifid, the lobes deflexed, margins minutely spinulose-serrate, up to 12 in. long; achenes black, fusiform, ribbed, the ribs muriculate, the beak ending in a cup-shaped disk
1. *runcinata.*

Glabrous or hispid herb with chiefly cauline leaves and heads in terminal paniculate racemes; leaves polymorphous but usually pinnatifid with a large hastate terminal lobe, the petiole slender or winged and auricled at base; achenes dark brown, flattened, 3-ribbed on either side, the beak ending in a flattened disk.....2. *hastata.*

1. LACTUCA RUNCINATA, DC. in Wt. Contrib. 26. *L. Heyneana*, DC; F. B. I. iii. 403. *Brachyramphus Heyneanus*, Wt. Ic. t. 1146.
   Most plains Districts, in fields and hedges and on old walls and among rocks.
   A tall glabrous herb with pinkish-white flowers.
2. LACTUCA HASTATA, DC.; F. B. I. iii. 407. *Mulgedium neilgheryense*, Wt. Ic. t. 1144.
   W. Ghâts, Nilgiri Hills, about 7,000 ft., in open spots in Shola forest.
   A tall herb with bluish-purple flowers.

Lactuca sativa, Linn., the Lettuce, is regularly cultivated as a vegetable and salad plant. Vern. *Hind.* Kahir, Salád.

Taraxacum officinale, Wigg.; F. B. I. iii. 401, the Dandelion, is found as a weed both in Nilgiris and Pulneys, but so far is not very common, though likely to spread.

61. Sonchus, Linn.

Annual or perennial milky herbs. *Leaves* radical or alternate, the cauline often amplexicaul and auricled, entire toothed or pinnatifid, margins usually spinulose-toothed. *Heads* homogamous, terminal, subcorymbose umbellate or panicled. *Involucre* ovoid campanulate or cylindric, often thickened at the base; bracts many-seriate, herbaceous, the outer smaller. *Receptacle* flat, naked. *Corollas* yellow, the ligules truncate and 5-toothed at apex. *Anther*-bases sagittate, auricles setaceo-acuminate. *Style*-arms slender. *Achenes* ovoid obovoid or ellipsoid, more or less compressed, ribbed, slightly contracted at base and apex but not beaked, smooth or transversely rugose; pappus copious, many-seriate, the hairs white, soft and silky, united at base in a deciduous ring.

Annual; leaves with acute spreading auricles, usually runcinate-pinnatifid; bracts glabrous or nearly so; achenes obovoid, ribbed, transversely muriculate ... . 1. *oleraceus.*
Perennial; leaves with obtuse appressed auricles, usually oblong or oblanceolate, shortly pinnatifid; bracts glandular-hispid; achenes oblong, narrow, ribbed and transversely rugose .. .. 2. *arvensis.*

1. SONCHUS OLERACEUS, Linn.; F. B. I. iii. 414. *S. ciliatus*, Lam.; Wt. Ic. t. 1141.
   Most Districts, especially in the hills and up to 8,000 ft., on roadsides, in gardens and cultivated lands, probably an introduction.
   A fleshy milky herb.
2. SONCHUS ARVENSIS, Linn.; F. B. I. iii. 414. *S. Wightianus*, DC.; Wt. Ic. t. 1142.
   Hilly Districts, occasional, in cultivated lands, probably an introduction.
   A tall perennial, the leaves mostly radical.

62. Launaea, Cass.

Perennial glabrous herbs, usually with yellow juice. *Leaves* chiefly radical, sinuate-lobed or pinnatifid, the margins often with cartilaginous or subspinous teeth. *Heads* homogamous, peduncled or subsessile, solitary fascicled racemose or paniculate. *Involucre* campanulate or cylindric; bracts many-seriate, herbaceous, often with scarious margins, the innermost subequal, the outer gradually shorter. *Receptacle* flat, naked. *Corollas* yellow, the ligules truncate and 5-toothed at apex. *Anther*-bases sagittate, the auricles acute or shortly setaceous. *Style*-arms slender. *Achenes* narrow, subterete angled or slightly flattened, rarely winged, truncate at both ends or rarely emarginate; ribs 4–5, stout, close-set, smooth papillose or narrowly winged; pappus copious, of simple very slender white many-seriate hairs, connate at base in a deciduous ring.

Stems and branches not rooting at the nodes; heads more or less racemose, solitary or fascicled on the flowering stem; leaves obovate-oblong, pinnatifid with rounded or obtuse segments, up to about 4 in. long, 1·5 in. broad, the margins with cartilaginous teeth; achenes columnar, thickly ribbed, smooth ..... 1. *nudicaulis.*
Stems and branches long, flagelliform, leaf-bearing and rooting at

the nodes; heads solitary or fascicled at the nodes; leaves oblong, runcinate-pinnatifid or sinuate-lobed, up to 3 in. long, ·5 in. broad, the teeth often white and cartilaginous; achenes pale, obtusely 4-gonous ..... 2. *pinnatifida*.

1. LAUNAEA NUDICAULIS, Less.; F. B. I. iii. 416.
   Deccan and Carnatic, in hot dry Districts as Bellary (Rangachari), Palamcottah in Tinnevelly (Wight).
   A perennial scapigerous herb.
2. LAUNAEA PINNATIFIDA, Cass.; F. B. I. iii. 416. *Microrhynchus sarmentosus*, Wt. Ill. t. 133.
   E. and W. Coasts, on sandy sea-shores.
   A trailing plant, useful as a sandbinder (*cf.* Clegh. Madr. Journ. i, t. 5), though rather weak.

Besides the many introduced plants which have been described or mentioned as having practically become part of the Flora of S. India, there are many others which are cultivated in gardens and in some cases have run wild in their neighbourhood. Few gardens in the plains are without some of the species of *Helianthus*, *Zinnia*, *Coreopsis*, *Tagetes*, *Gaillardia*, *Chrysanthemum*, *Calendula*; *Callistephus* and *Dahlia* of various colours may be seen in and about the hill stations running wild on the slopes. Many others that have been introduced and grown might be mentioned. There are some species of Compositae that are grown occasionally as vegetables, besides those that have been already mentioned. Among them would come *Helianthus tuberosus*, Linn., the Jerusalem Artichoke, etc.

Family LXXXVII. GOODENIACEAE.

Herbs or shrubs, juice not milky. *Leaves* alternate or radical, rarely opposite; stipules 0. *Flowers* hermaphrodite, regular or irregular, axillary or terminal, solitary or in spikes, racemes or panicles. *Calyx*-tube adnate to the ovary or rarely free; limb 5-lobed or nearly obsolete. *Corolla*-lobes 5, valvate in bud. *Stamens* 5, alternate with the corolla-lobes, inserted at the base of the corolla. *Ovary* 1–2-celled; ovules in each cell 1 or many, on the dissepiment; style simple with a cup-shaped sheath including the stigma. *Fruit* a drupe or capsule. *Seeds* albuminous, embryo straight, radicle inferior.

Scaevola, Linn.

Herbs or shrubs. *Leaves* simple, entire or toothed. *Flowers* axillary, solitary or in dichotomously branched cymes, sessile or pedicellate. *Calyx*-tube adnate to the ovary; limb usually short, annular or 5-lobed, sometimes 0. *Corolla* oblique, split at the back to the base; lobes subequal, at length digitately spreading. *Stamens* free. *Ovary* 2-celled; ovules 1–2, erect, sheath cupular; stigma truncate or divaricately 2-lobed. *Fruit* an indehiscent drupe; exocarp thin or fleshy; endocarp hard and woody, rarely crustaceous. *Seeds* solitary.

Calyx-lobes conspicuous, nearly equal to the ovary; drupe white; leaves obovate, 4–8 in. long.....1. *frutescens.*
Calyx-lobes very short, much shorter than the ovary, or the tube truncate; drupe purple; leaves elliptic or obovate, 1·5–3 in. long
2. *Plumieri.*

1. SCAEVOLA FRUTESCENS, Krause. *S. Koenigii,* Vahl; F. B. I. iii. 421. *S. Taccada,* Roxb.; Wt. Ill. t. 137.
   W. Coast, near the sea.
   A large shrub with large fleshy leaves, white flowers in axillary cymes and a white somewhat lobed drupe, ·75 in. in diam. Vern. *Mar.* Bhadrak.
2. SCAEVOLA PLUMIERI, Vahl. *S. Lobelia,* Murr.; F. B. I. iii. 421. *S. uvifera,* Stocks; Wt. Ic. t. 1613.
   Sea coast near Tuticorin in Tinnevelly (Wight, Rangachari).
   A small branching shrub with rather small fleshy leaves, yellowish flowers in small cymes and a smooth purple drupe ·5 in. in diam.

Family LXXXVIII. CAMPANULACEAE.

Herbs, undershrubs or shrubs, erect or climbing, often with milky juice. *Leaves* alternate or rarely opposite, entire toothed or rarely lobed; stipules 0. *Flowers* hermaphrodite, rarely unisexual by abortion, axillary or terminal, solitary racemose or paniculate; bracts small, bracteoles usually 0. *Calyx*-tube adnate to the ovary; limb 4–6-partite, usually persistent. *Corolla* superior, tubular rotate or campanulate, sometimes bilabiate, lobes as many as those of the calyx, valvate. *Stamens* as many as the corolla-lobes and alternate with them, inserted

on the epigynous disk or (in *Sphenoclea*) on the corolla-tube; anthers free or united in a tube. *Ovary* 2–5-celled; placentas axile, many-ovuled; style simple, cylindric; stigma-lobes as many as the ovary cells. *Fruit* a capsule or berry, sometimes indehiscent and dry. *Seeds* very many, small, albuminous; testa thin; embryo straight, axial, radicle inferior.

Corolla zygomorphic, 2-lipped; anthers connate:—
Fruit an indehiscent berry.....1. **Pratia.**
Fruit a capsule, 2-valved at the crown.....2. **Lobelia.**
Corolla actinomorphic; anthers free:—
Capsule loculicidally dehiscent within the calyx-teeth; flowers lax:—
Corolla rotate, deeply cleft, with linear lobes; stigma capitate 3. **Cephalostigma.**
Corolla campanulate, the lobes short; stigma lobed 4. **Wahlenbergia.**
Capsule circumscissile; flowers in a dense cylindric spike 5. **Sphenoclea.**
Capsule dehiscing at the base or sides below the calyx-teeth; corolla campanulate; stigma lobed.....6. **Campanula.**

1. Pratia, Gaud.

Herbs. *Leaves* alternate, toothed. *Flowers* solitary, axillary, peduncled. *Calyx*-limb 5-lobed. *Corolla* oblique, 2-lipped, the upper lip 2-partite, the lower 3-lobed. *Staminal tube* free or nearly so; anthers connate, the 2 lower with terminal bristles. *Ovary* inferior, 2-celled; placentas hemispheric; stigma 2-lobed or emarginate. *Fruit* ellipsoid, indehiscent, crowned with the calyx-lobes. *Seeds* very many, minute.

PRATIA BEGONIFOLIA, Lindl.; F. B. I. iii. 422.
W. Ghâts, Shembaganur, Madura, at 6,000 ft. (Saulière).
A small trailing and rooting herb with ovate cordate leaves about ·5 in. long, a corolla green marked with pink and a soft black ellipsoid berry.

2. Lobelia, Linn.

Herbs of various sizes, from very small to large and tall, or undershrubs. *Leaves* alternate, usually toothed. *Flowers* on axillary, 1-flowered, sometimes subracemose peduncles; bracts

leafy; bracteoles small or 0. *Calyx* superior; limb 5-partite. *Corolla* oblique, 2-lipped, the upper 2-partite, the lower 3-lobed, *Staminal-tube* free or nearly so; anthers connate, 2 or all penicillate at the apex. *Ovary* inferior, 2-celled; placentas hemispheric; stigma shortly bifid. *Fruit* a loculicidally 2-valved capsule within the calyx-teeth. *Seeds* very many, minute, ellipsoid, compressed or trigonous.

Small herbs with small flowers:—

Seeds trigonous; anthers all penicillate at tip; leaves ovate, denticulate, subsessile, glabrous.....1. *trigona.*

Seeds not trigonous; two anthers only penicillate at tip:—

Seeds compressed; leaves ovate or elliptic, subsessile, obtuse and then narrowed at base, dentate.....2. *trialata.*

Seeds ovoid; leaves oblong or rhomboid, narrowed at base, crenate, sessile and subdecurrent.....3. *zeylanica.*

Tall erect herbs with large flowers; anthers with few long hairs at tip:—

Leaves glabrous or nearly so, thin; racemes pubescent; anthers more or less villous on the back.....4. *nicotianaefolia.*

Leaves softly villous, thick; racemes softly villous; anthers glabrous on the back.....5. *excelsa.*

1. LOBELIA TRIGONA, Roxb.; F. B. I. iii. 423; Wt. Ic. t. 1170.

   All plains Districts, in wet places, also in the Hills, common.

   A glabrous annual, up to about 1 ft. high, rooting near the base and often prostrate, with pale blue or violet flowers.

2. LOBELIA TRIALATA, Buch.-Ham.; F. B. I. iii. 425.

   Hills of the N. Circars, Deccan and W. Ghâts, above 3,000 ft., less common in plains.

   A glabrous annual, up to 15 in. high, with winged stems and pale blue flowers.

3. LOBELIA ZEYLANICA, Linn.; F. B. I. iii. 425.

   Deccan, in Mysore (Meebold); W. Ghâts, in the Anamalais and hills of Travancore.

   An erect or more or less prostrate herb with scattered hairs on the leaves and bluish flowers, rather large.

4. LOBELIA NICOTIANAEFOLIA, Heyne; F. B. I. iii. 427; Wt. Ill. t. 135.

   W. Ghâts, in all Districts, at 3,000–7,000 ft.

A large perennial or biennial herb reaching 5–12 ft. high, the stems hollow, the inflorescence a long cylindric raceme with large white flowers, tinged with lilac.

Var. *trichandra*, C. B. Clarke. *L. trichandra*, Wt. Ic. t. 1171. More slender, more branching and lax, the anthers with white hairs on their backs.

W. Ghâts, Nilgiris to hills of Tinnevelly, at about 3,000–4,000 ft.

5. LOBELIA EXCELSA, Lesch.; F. B. I. iii. 427; Wt. Ic. tt. 1173–4. *L. aromatica*, Moon; Wt. Ic. t. 1172.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 6,000 ft.

A large usually biennial herb, similar to the last but with a much denser raceme of flowers, which are pale yellow tinged with purple, the leaves thick and softly tawny-villous.

3. Cephalostigma, A. DC.

Slender erect annual herbs, often hispidly hairy. *Leaves* alternate, subsessile, the margin thickened, entire waved or crisped. *Flowers* very small, in lax racemes or panicles; pedicels filiform; bracts very small. *Calyx* superior; limb 5-partite. *Corolla* deeply 5-fid; lobes linear lanceolate, usually blue or whitish. *Stamens* 5, free from the corolla; filaments dilated at the base; anthers free. *Ovary* inferior, subglobose, 2–3-celled; style cylindric; stigma shortly obtusely 3-lobed. *Fruit* a loculicidally 2–3-valved capsule, opening within the persistent calyx-teeth. *Seeds* very many, small, ellipsoid, compressed or trigonous.

Seeds oblong-ellipsoid, compressed; capsule hispid:—

Stem erect, up to 16 in. long, with few branches, occasionally with many from near the base; leaves oblong, acute, undulate, distantly mucronate-dentate; flowers in short lax leafy cymes at the ends of the branches, pedicels about ·5 in. long.....1. *Schimperi.*

Stem flexuose, up to 8 in. long, dichotomously branched; leaves ovate, distantly mucronate-dentate; flowers in lax leafy cymes from the stems, pedicels about ·75 in. long .....2. *flexuosum.*

Seeds trigonous; capsule glabrous; stem erect, short, bearing dichotomous cymes from the leafy nodes; leaves ovate-oblong, crenate

and mucronate in the crenatures; cymes nearly naked, pedicels up to nearly 1 in. long.....3. *Hookeri.*

1. CEPHALOSTIGMA SCHIMPERI, Hochst.; F. B. I. iii. 428. *Wahlenbergia perotifolia*, W. & A. 405; Wt. Ic. t. 842.
   N. Circars, Deccan and W. Ghâts, in hilly country, up to 5,000 ft., usually in shady places or among rocks, sometimes in open sandy lands.
   A slender annual with bluish flowers, usually erect and little branched, but sometimes much branched when growing in open places.
2. CEPHALOSTIGMA FLEXUOSUM, Hook. f. & Th.; F. B. I. iii. 428.
   Deccan, Bababudan Hills of Mysore (Law), hills of N. Coimbatore at 3,700 ft. (Fischer), Ramandrúg in Bellary (Lawson).
   A slender annual with yellow flowers (Lawson).
3. CEPHALOSTIGMA HOOKERI, C. B. Clarke; F. B. I. iii. 429.
   W. Ghâts, Kumili in Travancore at 3,000 ft. (Meebold).
   A slender herb with blue flowers.

4. Wahlenbergia, Schrad.

Annual or perennial herbs. *Leaves* alternate or opposite. *Flowers* on terminal or leaf-opposed peduncles, solitary or panicled; bracts minute. *Calyx* superior, limb 5-partite. *Corolla* campanulate, 5-lobed, sometimes to near the base. *Stamens* 5, free from the corolla; filaments often dilated near the base; anthers oblong, free. *Ovary* turbinate, 2–3-celled; style cylindric; stigma 2–5-, usually 3-lobed. *Fruit* a capsule, loculicidally 2–3-valved within the persistent calyx-teeth. *Seeds* very many, minute.

WAHLENBERGIA GRACILIS, Schrad.; F. B. I. iii. 429. *W. agrestis*, A. DC.; Wt. Ic. t. 1175.
W. Ghâts, Nilgiris and Pulneys, up to 7,000 ft.
An erect perennial herb with blue flowers on long peduncles and linear leaves.

5. Sphenoclea, Gaertn.

An erect annual glabrous marsh herb. *Leaves* alternate, lanceolate, entire. *Flowers* small, sessile, in dense terminal or

leaf-opposed peduncled spikes, each with 1 bract and 2 bracteoles. *Calyx*-tube adnate to the ovary, hemispheric; limb 5-lobed, the lobes ovate. *Corolla* campanulate, 5-lobed, the lobes valvate. *Stamens* 5, on the base of the corolla; filaments shortly dilated at base; anthers short, free. *Ovary* semi-inferior, 2-celled; ovules many, on axile placentas; style short; stigma obscurely 2-lobed. *Fruit* a membranous depressed-globose capsule circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, minute, oblong.

SPHENOCLEA ZEYLANICA, Gaertn.; F. B. I. iii. 438. *S. Pongatium*, A. DC.; Wt. Ill. t. 138.

Most Districts, in swampy places, especially near the coast. A stout herb reaching 1–3 ft. in height with oblong-lanceolate, glaucous green leaves up to 3 in. long and greenish-yellow flowers in close spikes.

6. Campanula, Linn.

Perennial or annual herbs, erect or decumbent. *Leaves* alternate or the radical subrosulate. *Flowers* blue purple or white, peduncled or subsessile, terminal or axillary or in a terminal usually pyramidal panicle. *Calyx*-tube adnate to the ovary, turbinate; limb deeply 5-lobed, sometimes with appendages in the sinuses between the lobes. *Corolla* campanulate, more or less deeply 5-lobed. *Stamens* 5, free; filaments dilated at the base; anthers free. *Ovary* inferior, 3- rarely 4–5-celled; ovules numerous in each cell; style cylindric; stigma shortly 3–5-lobed. *Fruit* an obovoid or elongate truncate capsule, dehiscing by small valves at the base or on the sides outside the calyx-lobes. *Seeds* very many, minute, ellipsoid or compressed and margined.

Capsule dehiscing by valves at the base:—

Erect herbs with subrosulate basal leaves and slender straight stems; flowers very small, dimorphic (one form complete, the other without corolla or stamens); capsule small, globose ..... 1. *canescens.*

Herbs with many branches from a stout rootstock:—

Stems up to 15 in. long, rather stout, softly strigosely villous, leafy, with oblanceolate distantly dentate leaves up to 1 in. long; flowers ·5 in. long, the triangular-lanceolate calyx-lobes ·2 in. long, dentate ..... 2. *ramulosa.*

Stems up to 8 in. long, slender, tufted, softly villous; leaves ovate, serrate, the lower ones only over ·5 in. long; flowers ·2–·3 in. long, the triangular toothed calyx-lobes scarcely ·1 in. long; corolla and stamens often absent.....3. *Wightii.*
Stems scarcely 6 in. long, many, spreading, wiry, pilose, with very small obovate crenate leaves scarcely ·2 in. long; flowers usually solitary at the ends of the branchlets, ·4 in. long, the ovate calyx-lobes ·1 in. long.....4. *Alphonsii.*

Capsule dehiscing by round pores near the top; erect herbs with rosulate basal leaves and distant cauline ones, all ovate or lanceolate, acute, crenate, petioled; flowers in an interrupted spike or raceme, the calyx-lobes linear; corolla cleft to near the base in narrow lobes
5. *fulgens.*

1. CAMPANULA CANESCENS, Wall.; F. B. I. iii. 439.
   Bababudan Hills of Mysore at 4,000 ft. (Meebold); Hills of Tinnevelly (Hooper and Ramaswami).
   A slender delicate herb with very small white flowers, in S. India (larger in the Himalaya), in shady places.
2. CAMPANULA RAMULOSA, Wall., *C. colorata*, C. B. Clarke; F. B. I. iii. 440, *in part, not of* Wall.
   W. Ghâts, Nilgiri and Pulney Hills, about 7,000 ft.
   An erect herb with leafy strigosely hairy stems, lanceolate leaves, calyx-lobes which are toothed and blue flowers, the pedicels short.
3. CAMPANULA WIGHTII, Gamble n. comb. *C. ramulosa*, Wt. Ic. t. 1178, *not of* Wall. *C. colorata*, C. B. Clarke in F. B. I. iii. 440, *in part, not of* Wall.
   W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft.
   A soft herb with many slender stems from a thick rootstock, ovate dentate leaves, short calyx-lobes and small purple flowers with short pedicels. It seems to be usually found without corolla or stamens, though fertile.
4. CAMPANULA ALPHONSII, Wall.; F. B. I. iii. 440, Wt. Ic., t. 1177.
   W. Ghâts, Nilgiri, Anamalai and Pulney Hills, above 6,000 ft., in clefts of rocks.
   A small tufted wiry herb with many stems, the flowers blue.
5. CAMPANULA FULGENS, Wall.; F. B. I. iii. 442; Wt. Ic. t. 1179.

W. Ghâts, Nilgiri, Anamalai and Pulney Hills above 5,000 ft.; Shevaroy Hills of Salem; Bababudan Hills of Mysore.

An erect herb with racemose terminal inflorescence and purple flowers.

Family LXXXIX. VACCINIACEAE.

Shrubs or small trees, often epiphytic. *Leaves* alternate or falsely whorled, entire or serrate; stipules 0. *Flowers* hermaphrodite, regular, in racemes or solitary axillary; pedicels 1-bracteate and often 2-bracteolate, frequently articulate below the ovary. *Calyx*-tube ovoid, adnate to the ovary; limb 5-fid, usually persistent. *Corolla* tubular urceolate or campanulate, 5-lobed, usually deciduous. *Stamens* 10, epigynous, free; anthers opening by apical pores or produced upwards in 2 tubes opening by slits. *Ovary* inferior, 5-celled or falsely 10-celled; ovules many; style cylindric; stigma simple. *Fruit* a 5- or falsely 10-celled berry, rarely dry and indehiscent. *Seeds* many, rarely 1, in each cell, small, compressed; albumen fleshy; embryo minute.

Vaccinium, Linn.

Shrubs, sometimes epiphytic. *Leaves* alternate. *Flowers* axillary or terminal, in racemes fascicles or corymbs rarely solitary; bracteate and 2-bracteolate. *Calyx*-tube globose; teeth 5, small. *Corolla* tubular or ovoid, white, pink or greenish. *Stamens* 10, free; anthers produced at the apex in 2 cylindric tubes with terminal openings. *Ovary* 5-, or apparently but falsely 10-, celled. *Berry* globose, 5-celled. *Seeds* 1 or more in each cell, compressed.

Large shrub; leaves lanceolate acuminate, crenate-serrate; corolla ·25 in. long, pubescent without; berries usually ·2 in. in diam. 1. *neilgherrense.*

Small stout trees; leaves ovate or ovate-lanceolate or orbicular, acute or obtuse, minutely serrate; corolla ·3 in. long, glabrous without; berries ·3 in. in diam. or more .. ..2. *Leschenaultii.*

1. VACCINIUM NEILGHERRENSE, Wt. Ic. t. 1189; F. B. I. iii. 454.

Bababudan Hills of Mysore, Shevaroy Hills of Salem, Kollimalai Hills of Trichinopoly; W. Ghâts, Nilgiris,

Anamalais, Pulneys and hills of Tinnevelly and Travancore, at about 3,000–7,000 ft. in Shola forest or, at lower levels, near streams.

A large shrub, occasionally a small tree with white or rose-coloured scented flowers in rather lax racemes. Bark thin, greyish-brown; wood reddish-brown. Vern. *Tam.* Kalávu.

2. VACCINIUM LESCHENAULTII, Wt. Ic. t. 1188; F. B. I. iii 455; Bedd. Fl. t. 227.

W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Travancore and Tinnevelly in Sholas above 5,000 ft.

A small pretty tree with ovate leaves and pink flowers in short close racemes. Bark thin, greyish-brown; wood light reddish-brown with pretty silver-grain. Berries edible. Vern. *Tam.* Kalávu; *Badaga*, Anduvan.

Var. *rotundifolia*, C. B. Clarke; Wt. Ill. t. 139. Leaves orbicular, 1–1·5 in. in diam. Nilgiri Hills (Wight, Gardner).

Family XC. ERICACEAE.

Trees, shrubs or perennial herbs. *Leaves* alternate or apparently whorled, entire or serrate; stipules 0. *Flowers* regular or sometimes slightly irregular, sometimes dimorphous. *Calyx* usually free, 5-, rarely 4- or 6-lobed. *Corolla* hypogynous, campanulate cylindric or urceolate, 4–5-lobed or sometimes petals free. *Stamens* 10, sometimes 5, 8 or 20, hypogynous or slightly attached to the base of the corolla; anthers opening by apical pores or produced upwards in tubes, sometimes dorsally spurred. *Ovary* 5-celled or rarely 4–16-celled; ovules many; style cylindric; stigma simple or shortly lobed. *Fruit* a capsule, 5- or more-celled, sometimes appearing baccate from the adherence of the enlarged succulent calyx. *Seeds* many, small, angled or compressed, albuminous.

Shrub; capsule 5-valved loculicidally, surrounded when ripe by the succulent enlarged calyx; flowers small; anthers spurred at apex **1. Gaultheria.**

Tree; capsule 10-valved septicidally, calyx small, not succulent in fruit; flowers large; anthers slightly spurred at base, not at apex **2. Rhododendron.**

1. Gaultheria, Linn.

Shrubs, erect or procumbent. *Leaves* persistent, alternate, serrulate. *Flowers* small, sometimes dimorphous, in axillary or terminal racemes or solitary; bracteate and 2-bracteolate. *Calyx* 5-lobed, free, afterwards succulent and enclosing the capsule. *Corolla* ovoid-tubular or campanulate, greenish-white or reddish; lobes 5, small. *Stamens* 10; filaments more or less dilated; anther-cells opening by slits at the apex and dorsally 2-spurred; in dimorphic flowers the stamens are small with simple anthers. *Ovary* 5-celled; ovules many in each cell; style cylindric; stigma simple. *Fruit* a 5-celled capsule enclosed in the succulent calyx, loculicidally 5-valved from the apex. *Seeds* many, minute, angled.

GAULTHERIA FRAGRANTISSIMA, Wall.; F. B. I. iii. 457; Bot. Mag. t. 5984. *G. Leschenaultii*, DC.; Wt. Ic. t. 1195.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 6,000 ft.

A large shrub with white or greenish flowers in axillary racemes, coriaceous elliptic serrulate leaves and blue succulent berries. Bark light brown, thin; wood light brown. The leaves give an oil like that of the Canadian wintergreen. The fruits are edible.

2. Rhododendron, Linn.

Trees or shrubs. *Leaves* coriaceous, entire, alternate, often clustered towards the ends of the branches. *Flowers* usually large, in terminal fascicles or pseudo-corymbs, rarely solitary or axillary; bracts broad, usually caducous; bracteoles linear. *Calyx* 5-lobed, persistent, usually very small. *Corolla* campanulate, funnel-shaped or tubular, 5–10-lobed. *Stamens* 5–18, usually 10; filaments slender; anthers oblong, dehiscing by terminal pores. *Ovary* 5–20-celled; ovules numerous in each cell; style slender; stigma capitate. *Fruit* a woody 5–20-celled capsule, dehiscing septicidally, the valves separating from the placentas from above downwards. *Seeds* very many, ellipsoid, albuminous, the testa often tailed or crested.

RHODODENDRON NILAGIRICUM, Zenk. Pl. Ind. Coimb. t. 15. *R. arboreum*, var. *nilagirica*, C. B. Clarke; F. B. I. iii. 466.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 5,000 ft., in open grass lands.

A tree with beautiful terminal heads of usually crimson bracteate flowers surrounded by the very coriaceous elliptic or elliptic-oblong leaves, very furfuraceous beneath, usually obtuse at both ends and with recurved margins. The hard capsule is about ·75 in. long. Bark reddish-brown wood reddish-white, soft, close- and even-grained, little used except as fuel. Vern. *Tam.* Alingi; *Mal.* Kattu puvarasu.

Family XCI. PLUMBAGINACEAE.

Herbs or undershrubs. *Leaves* alternate, the radical usually rosulate; stipules 0. *Flowers* hermaphrodite, regular, in terminal scapes or branches, in heads spikes racemes or panicles; bracts often scarious; bracteoles 2. *Calyx* inferior, gamosepalous, tubular, 5–10-ribbed, often hyaline between the ribs, lobes 5. *Corolla* hypogynous, of 5 petals free or connate at the base or united in a linear tube. *Stamens* 5, opposite the petals; filaments nearly free or adnate below to the corolla; anthers oblong. *Ovary* superior, 1-celled, 5-angular above; ovule 1, pendulous from a basal ascending funicle; styles 5, free or connate below; stigmas subcapitate. *Fruit* a capsule, membranous below and circumsciss, hardened above and there 5-valved. *Seed* cylindric, pendulous; albumen floury or 0; embryo straight; cotyledons linear or oblong, radicle superior.

Plumbago, Linn.

Perennial herbs or undershrubs, often scandent. *Leaves* alternate, entire, petiole often auricled at base. *Flowers* white rose-coloured or blue in terminal spikes. *Calyx* tubular, covered with stalked glands, lobes 5. *Corolla*-tube long, slender; lobes 5, spreading. *Stamens* free; anthers oblong, dorsifixed. *Ovary* narrowed at apex; styles divided into stigmatose branches. *Capsule* circumsciss at the base, hardened above. *Seed* solitary; albumen scanty, cotyledons oblong.

PLUMBAGO ZEYLANICA, Linn.; F. B. I. iii. 480; Wt. Ill. t. 179.
All Districts in the Plains, common, wild or in cultivation.
A rambling subscandent perennial herb with white flowers and a conspicuously glandular persistent calyx, the leaves ovate, membranous. The root is used in medicine. Vern. *Hind.* Chita.

P. rosea, Linn., is a pretty species with bright red flowers and larger leaves, frequently, found in cultivation or as an escape. *P. capensis*, Thunb., is a climber with pale blue flowers also found in gardens.

Family XCII. PRIMULACEAE.

Perennial, rarely annual herbs. *Leaves* radical or cauline; stipules 0. *Flowers* hermaphrodite, regular, solitary or racemose in the leaf axils or solitary or in umbels on an elongated scape; bracts variable, sometimes 0. *Calyx* inferior, 5-, rarely 4–9-cleft, rarely superior. *Corolla* usually hypogynous, rotate campanulate or funnel-shaped, 5-, rarely 4–9-lobed. *Stamens* inserted on the corolla-tube and opposite its lobes, sometimes with alternating staminodes; filaments usually short; anthers 2-celled, dehiscing longitudinally. *Ovary* 1-celled, usually free, ovoid or subglobose; ovules many, on a free central placenta; style short or long; stigma entire. *Fruit* a capsule dehiscing tranversely or by valves. *Seeds* few or many, minute, usually angular, often sunk in the placenta; albumen fleshy or horny; embryo transverse.

Corolla-lobes imbricate, tube short; capsule dehiscing by valves; herbs, usually scapigerous ..... 1. **Androsace.**
Corolla-lobes contorted, separate nearly to the base; leaves opposite or alternate: -
Capsule dehiscing by valves ..... 2. **Lysimachia.**
Capsule circumscissile ..... 3. **Anagallis.**

1. Androsace, Linn.

Annual or perennial low herbs. *Leaves* rosulate or imbricate on the branches. *Flowers* small, white lilac or red. *Calyx* 5-lobed. *Corolla* salver-shaped with a short tube or funnel-shaped; limb imbricately 5-lobed, the mouth annulate or with folds opposite the lobes. *Stamens* 5; anthers subsessile, included in the tube, obtuse. *Ovary* globose; style short. *Capsule* ovoid or globose, 5-valved. *Seeds* angular or subglobose; embryo transverse.

ANDROSACE SAXIFRAGAEFOLIA, Bunge; F. B. I. iii. 496.

N. Circars, in Ganjam (*Barber*) in open pasture lands.

An annual herb with rosulate suborbicular cordate crenate leaves, white flowers with filiform pedicels in bracteate

umbels on slender scapes, and white capsules with several angular pitted seeds.

2. Lysimachia, Linn.

Erect procumbent or creeping herbs. *Leaves* entire, alternate, opposite or whorled. *Flowers* solitary, white pink or yellow, on axillary pedicels or in terminal or axillary racemes or panicles; bracts usually conspicuous, sometimes 0. *Calyx* 5–6-partite. *Corolla* rotate or funnel-shaped, deeply 5–6-lobed. *Stamens* inserted on the base of the corolla lobes, sometimes connate at the base in a short tube; anthers oblong, obtuse. *Ovary* subglobose; ovules many; style filiform, persistent; stigma obtuse. *Fruit* a globose or subglobose capsule, 5-valved or bursting irregularly. *Seeds* many, trigonous or plano-convex; embryo transverse.

Flowers pink in elongate terminal racemes, pedicels slender, bracts subulate; leaves alternate, lanceolate, acute, smooth or crisped at the margins, glabrous, gland-dotted; corolla-lobes obovate, spathulate; stamens with slender exsert filaments.....1. *Leschenaultii.*

Flowers white in slender terminal racemes, pedicels slender, bracts subulate; leaves alternate oblanceolate or spathulate, acute, glabrous, gland-dotted; corolla-lobes obovate; filaments slender, not exsert
2. *obovata.*

Flowers yellow, solitary or in pairs in the leaf-axils; pedicels slender, pubescent; bracts 0; leaves opposite, ovate, acute or obtuse, crispate-pubescent; corolla-lobes broadly obovate, gland-dotted; stamens included, the filaments united at the base.....3. *deltoidea.*

1. Lysimachia Leschenaultii, Duby; F. B. I. iii. 501; Wt. Ic. t. 1204.
   W. Ghâts, Nilgiris, Anamalais and Pulneys, in moist or marshy soils above 6,000 ft.
   A tall herb with pretty, many-flowered racemes.
2. Lysimachia obovata, Buch.-Ham.; F. B. I. iii. 502.
   W. Ghâts, Nilgiris, on the downs about 7,000-ft. (Williams).
   A slender herb.
3. Lysimachia deltoidea, Wt. Ill. t. 144; F. B. I. iii. 505.
   W. Ghâts, Nilgiris, Anamalais and Pulneys, on shady banks, above 6,000 ft.

A slender trailing herb not unlike the "Creeping Jenny" of Europe (*L. nummularia*) but with much crisp pubescence.

3. Anagallis, Tournef.

Annual or perennial herbs. *Leaves* opposite, entire. *Flowers* solitary, axillary, peduncled, red blue or white; bracts 0. *Calyx* 5-partite. *Corolla* rotate, 5-partite, the lobes contorted. *Stamens* 5, adnate to the corolla. *Ovary* globose; ovules many; style filiform. *Fruit* a globose circumsciss capsule. *Seeds* many, peltate.

Corolla longer than the calyx; leaves opposite; erect or procumbent much-branching herbs with 4-angled stems ..... 1. *arvensis.*
Corolla shorter than the calyx; leaves alternate or the lower sub-opposite; small erect herbs with angular stems somewhat winged 2. *pumila.*

1. ANAGALLIS ARVENSIS, Linn.; F. B. I. iii. 506. *A. latifolia*, Linn.; Wt. Ic. t. 1205.
   All Districts, a weed of cultivated fields. Pimpernel.
   So far as is recorded, only the blue-flowered form (var. *caerulea*, Gren. and Godr.) occurs in S. India.
2. ANAGALLIS PUMILA, Swartz. *Centunculus tenellus*, Duby; F. B. I. iii. 506; Wt. Ic. t. 2000. *Micropyxis tenella*, Wt. Ic. t. 1585.
   N. Circars, Bison Hills of Godavari (Barber); Deccan, at Hosur in Salem; W. Ghâts, Nilgiris and Anamalais at about 3,000 ft., among grass.
   A small slender erect annual weed with white flowers.

Family XCIII. MYRSINACEAE.

Trees, shrubs (erect or climbing) or undershrubs, generally evergreen. *Leaves* alternate or sometimes opposite, simple, usually gland-dotted; stipules 0. *Flowers* regular, hermaphrodite or polygamo-dioecious, often with resinous glands. *Calyx* inferior (in *Maesa* adnate to the ovary), 4–6-lobed, persistent, sometimes enlarged in fruit, often with glandular dots or lines. *Corolla*-tube usually short or none; lobes 4–6, contorted or imbricate, rarely valvate, often gland-dotted or -striate. *Stamens* as many as and opposite to the corolla-lobes; filaments usually short; anthers

opening by slits, sometimes septate; staminodes sometimes present. *Ovary* globose or ovoid, 1-celled; ovules few or many, on a free central usually globose placenta; style filiform or columnar; stigma simple, rarely shortly lobed. *Fruit* a small globose (in *Aegiceras* linear, curved, acuminate), indehiscent, 1–many-seeded berry. *Seeds* usually globose, hollowed at the base (in *Maesa* many and angled), albumen pitted or ruminate; embryo transverse.

Calyx-tube adnate to the ovary; fruit many-seeded: trees or shrubs
1. **Maesa.**

Calyx-tube free from the ovary; fruit 1-seeded:—
Fruit globose, anther-cells usually opening by slits:—
Corolla-lobes imbricate in bud, free or tube very short; anthers cordate:—
Flowers in axillary or lateral fascicles; trees or shrubs
2. **Rapanea.**
Flowers in racemes or panicles; shrubs or climbers
3. **Embelia.**
Corolla-lobes contorted in bud:—
Anthers sagittate, rarely septate; corolla-lobes overlapping to the right.....4. **Ardisia.**
Anthers lanceolate, the connective produced in a wing; corolla-lobes overlapping to the left.....5. **Antistrophe.**
Fruit elongate, cylindric, curved, long pointed; anthers septate
6. **Aegiceras.**

1. **Maesa,** Forsk.

Trees or shrubs, erect or straggling. *Leaves* entire, dentate or serrate, usually pellucid-punctate, sometimes with resinous lines. *Flowers* small, hermaphrodite or unisexual, in terminal or axillary often panicled racemes; bracts small; bracteoles 2. *Calyx*-tube adnate to the ovary; lobes 4–5, small, persistent. *Corolla* shortly campanulate, 4–5-lobed, the lobes imbricate, rounded with inflexed tips, sometimes resinous-lineate. *Stamens* 4 or 5 inserted on the corolla-tube; filaments short; anthers introrse, oblong-cordate. *Ovary* adnate to the calyx-tube; ovules numerous, on a globose placenta; style short; stigma entire or lobed. *Fruit* a small dry or fleshy globose berry, crowned with the persistent style. *Seeds* numerous, angular, arranged around the placenta

with hexagonal surfaces; embryo small, transverse; cotyledons narrowly ovate.

Calyx-lobes ciliate on the margins:—

Branches and leaves beneath densely ferruginous-tomentose when young, later on pilose; leaves elliptic, acuminate; serrate, usually obtuse at base, the petioles ·5 in. long.. .....1. *velutina*

Branches and leaves sparsely pilose: leaves elliptic, acuminate, coarsely serrate, slightly attenuate at base, the petioles ·75 in. long 2. *dubia*

Calyx-lobes not ciliate on the margins; whole plant glabrous: leaves ovate-lanceolate, acuminate, coarsely dentate or serrate, acute at base, the petioles about 1 in. long.....3. *Perrottetiana*.

1. MAESA VELUTINA, Mez in Engl. Monog. Myrs. 35.
   W. Ghâts, in Wynaad (Beddome).
   Apparently a large shrub very ferruginous-tomentose when young, less so when old, the leaf serratures strong and regular.
2. MAESA DUBIA, Wall. · F. B. I. iii. 510.
   Hills of Mysore, Brumagiris, etc., at 3,000–5,000 ft., Wynaad; S. Canara.
   A large shrub, more or less pilose, perhaps only a variety of the next.
3. MAESA PERROTTETIANA, A. DC. *M. indica* var. *Perrottetiana*, C. B. Clarke; F. B. I. iii. 509. *M. indica*, Wt. Ic. t. 1206 *not of* A. DC.
   W. Ghâts, in all Districts, up to 6,000 ft., chiefly on waste lands and in open forests, common; Shevaroy Hills of Salem and Kollimalai Hills of Trichinopoly.
   A small tree or large shrub with ovate lanceolate acuminate or even caudate-acuminate, coarsely dentate or serrate, glabrous leaves with long petioles, the white flowers very small, the berries white. Bark thin, reddish-brown, lenticellate; wood brownish-white, soft. Vern. *Mal.* Kirithi.

2. Rapanea, Aubl.

Trees or shrubs. *Leaves* coriaceous, usually entire and marked with resinous dots or lines. *Flowers* polygamous or dioecious, small, sessile or shortly pedicelled, in umbellate rarely

racemose fascicles on short thick peduncles, in the axils of the leaves or on the branches below the leaves; bracts imbricate. *Calyx* small, persistent, 4–5-lobed, often glandular-dotted. *Corolla*-tube very short or almost 0, lobes 4–5, spreading, valvate, gland-dotted. *Stamens* inserted on the corolla; filaments 0; anthers ovate. *Ovary* free, globose or ovoid, 1-celled; ovules few or many, immersed in the placenta; style short; stigmas 2–5, erect or spreading, sometimes cup-shaped. *Fruit* a small globose, dry or subfleshy berry, the endocarp often glandular-striate. *Seed* solitary, albumen usually pitted; embryo elongate, often curved.

Flowers sessile or nearly so; branchlets stout, rough; leaves very shortly petioled, elliptic or obovate, up to 4·5 in. long by 1·5–2 in. wide, obtusely acute; calyx and corolla both densely covered with resinous dots and lines..... .....1. *capitellata* var. *sessilis*.

Flowers very shortly pedicelled; branchlets not very stout; leaves with slender petioles:—

Calyx-lobes with few resinous lines or dots:—

Corolla-lobes with few dots at apex only; leaves oblanceolate, obtuse or emarginate, up to 3 in. long, 1 in. broad, chartaceous, striate .....2. *striata*.

Corolla-lobes densely papillose, sparsely dotted; leaves linear-lanceolate, obtuse, up to 2·5 in. long, ·5 in. broad, coriaceous 3. *daphnoides*.

Calyx-lobes with many resinous lines and dots; corolla-lobes gland-dotted or -lined all over; leaves oblanceolate, obtuse, up to 3 in. long, 1 in. broad ..... 4. *Wightiana*.

Flowers with pedicels about ·2 in. long; branchlets thick; leaves obovate or oblanceolate, up to 4 in. long, 1·25 in. broad, rounded or emarginate at apex; corolla-lobes sparsely dotted.....5. *Thwaitesii*.

1. RAPANEA CAPITELLATA, Mez. *Myrsine capitellata*, Wall.; F. B. I. iii. 512, *in part*.

Var. *sessilis*, Gamble. Leaves sessile or nearly so, not long petioled as in the northern forms.

W. Ghâts, Anamalai Hills, on grass-lands at high elevations (Barber); Travancore Hills, above 6,000 ft. (Bourdillon).

A small tree.

2. RAPANEA STRIATA, Mez Monog. Myrs. 357.

Bababudan Hills of Mysore (Law).

Apparently a small tree.

3. RAPANEA DAPHNOIDES, Mez Monog. Myrs. 357.
W. Ghats, hills of Tinnevelly and Travancore, at about 6,000 ft.
A low shrub probably, with narrow linear-lanceolate leaves.

4. RAPANEA WIGHTIANA, Mez. *Myrsine capitellata* var. *lanceolata*, C. B. Clarke in F. B. I. iii. 512. *M. capitellata*, Wt. Ic. t. 1211; Bedd. Fl. t. 234.
W. Ghâts, Nilgiris, Pulneys and hills of Tinnevelly and Travancore, above 6,000 ft., in evergreen Shola forests.
A small tree. Bark thick, grey; wood grey, moderately hard. Vern. *Badaga* Kokili.

5. RAPANEA THWAITESII, Mez Monog. Myrs. 357.
W. Ghâts, Pulney Hills of Madura, 6,500 ft. (Wight).
A small tree, the flowers pedicellate.

3. Embelia, Burm.

Small trees or shrubs, usually climbing. *Leaves* alternate, entire or toothed, usually glandular, petiole often margined or glandular. *Flowers* small, hermaphrodite or polygamo-dioecious, white or pink, in axillary or terminal simple or compound racemes or panicles; bracts usually small; bracteoles 0. *Calyx* free, persistent, 4–5-lobed. *Corolla*-tube none or short; petals 4–5, usually imbricate in bud. *Stamens* 4–5; filaments inserted on the corolla, short or elongate; anthers ovate-oblong. *Ovary* ovoid or globose; ovules few, on a subglobose placenta; style short; stigma capitate. *Fruit* a small globose usually 1-seeded berry. *Seed* globose, hollowed at the base; testa membranous; albumen pitted; embryo transverse, curved.

Petals 5. Inflorescence terminal and axillary, in racemes or panicles of racemes; climbers :—

Petals very small, villous on both sides; leaves chartaceous, elliptic or elliptic-lanceolate, obtusely acute, 2-3 in. long, 1 in. broad, gland-dotted and with glandular pits near the midrib beneath, petiole slender ..... 1. *Ribes.*

Petals rather larger, glabrous without, papillose within; leaves coriaceous, elliptic-ovate or -oblong, acute, up to 6 in. long, 2·5 in. broad, not gland-dotted or -pitted, petiole stout ..... 2. *adnata.*

Inflorescence axillary :—

Inflorescence of subumbellate racemes on very short peduncles, petals oblong, gland-dotted; leaves ovate, coriaceous, crenate,

prominently reticulate, rusty-pilose on the nerves beneath or on the branchlets, up to 3 in. long, 1·5 in. broad; climber
3. *Gardneriana.*

Inflorescence racemose, axillary to the normal leaves without imbricate scales at its base; erect with membranous leaves:—

Leaves glabrous, pale and reticulate beneath, elliptic-obovate, cuneate, abruptly acuminate, sometimes slightly dentate, up to 3·5 in. long, 2 in. broad; racemes nearly glabrous, about 2-3 in. long, petals obtuse, papillose within; anthers exsert, orbicular, mucronate, glandular on the back
4. *Tsjeriam-Cottam.*

Leaves beneath stellate-pubescent, elliptic-obovate, cuneate, abruptly acuminate, up to 4 in. long, 2·5 in. broad; racemes very villous, 1–3 in. long, calyx-lobes, petals and ovary with many minute stalked glandular hairs: anthers exsert, ovoid, mucronate, glandular ..... 5. *villosa*

Petals 4; inflorescence axillary to the scars of fallen leaves with imbricate scales at its base; climbing shrub with coriaceous elliptic-obovate leaves narrowed at base, up to 4 in. long, 1·5 in. broad, racemes less than 1 in. long, the petals with orange-coloured papillae inside ..... 6. *Basaal.*

1. EMBELIA RIBES, Burm.; F. B. I. iii. 513. *E. glandulifera.* Wt Ic. t. 1207.

N. Circars, hills of Vizagapatam, 4,000 ft.; W. Ghâts. in all Districts, in evergreen forests at elevations up to about 4,000 ft.

A large climbing shrub with small white or greenish-white flowers and a globose peppercorn-like fruit. Bark brown, rough with conical hard protuberances. Vern. *Hind.* Baberang.

2. EMBELIA ADNATA, Bedd.; F. B. I. iii. 514.

W. Ghâts. Bolampatti Hills of Coimbatore at 5,000 ft. (Beddome); High Wavy Mountain in Madura at 4,000–5,000 ft. (Blatter and Hallberg).

A large climbing shrub with large thick leaves, the margins [illegible] ved.

3. EMBELIA GARDNERIANA, Wt. Ic. t. 1208; F. B. I. iii. 517.

W. [illegible]its. Sispara Ghât in Nilgiris, at 5,000 ft.

A climbing shrub with white flowers and fruit ·25 in. in [illegible] the branches clothed with rufous hairs

4. EMBELIA TSJERIAM-COTTAM, A. DC.; Wt. Ic. t. 1209. *E. robusta*, C. B. Clarke; F. B. I. iii. 515, *not of* Roxb.

   Most Forest Districts in the Circars and Deccan; deciduous forest areas in the W. Ghâts, up to about 3,000 ft.

   A large shrub or small tree with greenish-white flowers, long racemes (in true *E. robusta*, Roxb., they are very short and capitulate) and red berries. Bark brown, horizontally cracked; wood reddish, resinous, with broad medullary rays. Vern. *Hind.* Baberang; *Ur.* Nuninunika, Baibedanga; *Mar.* Ambati.

5. EMBELIA VILLOSA, Wall. *E. robusta*, C. B. Clarke; F. B. I. iii. 515, *in part*

   N. Circars, forests of Ganjam and Vizagapatam, up to 4,500 ft.; Deccan, hills of Mysore.

   A shrub or small tree similar to the last but with villous leaves and racemes and more glandular flowers, sometimes tetramerous.

6. EMBELIA BASAAL, A. DC., Mez Monog. Myrs. 328. *E. viridiflora*, C. B. Clarke; F. B. I. iii. 516. *Choripetalum aurantiacum*, A. DC.; Wt. Ic. t. 1210. *Samara Rheedii*, Wt. Ic. t. 1591.

   Deccan, Bababudan Hills of Mysore; Carnatic, Melpat in S. Arcot, Kollimalai Hills of Trichinopoly, Shevaroys; W. Ghâts, in most Districts at 2,000–5,000 ft.

   A large climbing shrub with racemes of orange-coloured flowers from the older branchlets.

4. Ardisia, Swartz.

Shrubs or small trees. *Leaves* sessile or petioled, membranous to coriaceous, entire crenate or serrate, usually gland-dotted. *Flowers* regular, hermaphrodite, in axillary lateral or terminal simple or compound umbels or racemes; pedicels often lengthening in fruit; bracts small, usually deciduous. *Calyx* 5-, rarely 4-, lobed, the lobes free or overlapping to the right, persistent. *Corolla* red, white or spotted, often waxy in appearance, 5-, rarely 4- or 6-, lobed, the lobes overlapping and twisted to the right in bud. *Stamens* as many as and opposite to the corolla-lobes; filaments short; anthers sagittate, dehiscing longitudinally and introrsely, in one species septate. *Ovary* globose; ovules few or many, immersed in a globose placenta; style cylindric:

stigma terminal, small. *Fruit* a globose or subglobose berry. *Seed* globose, hollowed at base; albumen pitted or ruminate; embryo cylindric, transverse.

Calyx-lobes small, usually not or only little overlapping to the right; inflorescence axillary or lateral, peduncles and pedicels slender; anthers apiculate:—

Leaves entire or very obscurely crenulate, glabrous, nerves not prominent:—

Calyx- and corolla-lobes punctate, the flowers also with capitate scales on the margins; inflorescence of few-flowered cymes or umbels, the peduncles short:—

Leaves rhomboid, acuminate both at apex and base, up to 4 in. long, 1·5 in. broad but usually smaller, margin usually recurved ..... 1. *rhomboidea.*

Leaves long-lanceolate, acuminate, up to 7 in. long 2 in. broad, but often smaller, margin not recurved. ....2. *paniculiflora.*

Calyx- and corolla-lobes not or very faintly punctate; leaves narrow-lanceolate, acuminate, up to 4 in. long, 1 in. broad, peduncles long and slender ....3. *depressa.*

Leaves crenate-serrate, prominently nerved, the nerves impressed on the upper surface, elliptic-lanceolate or oblanceolate, caudate acuminate at apex, cuneate at base, up to 4 in. long, 1·5 in. broad, calyx- and corolla-lobes densely black-punctate; cymes with many very small flowers ....4. *Blatteri.*

Calyx-lobes moderate-sized, acute, overlapping to the right; inflorescence paniculate, terminal or subterminal; anthers acute:—

Panicles short, compact; leaves prominently dotted with glands near the margin, faintly crenulate:—

Leaves oblong lanceolate, acuminate, membranous, rounded at base, up to 6 in. long, 1·5 in. broad; peduncles short, slender, as are the pedicels, umbels few-flowered ....5. *amplexicaulis.*

Leaves obovate or oblanceolate, acuminate, decurrent on the petiole, chartaceous, up to 9 in. long 2 in. broad; peduncles stout as are the pedicels, umbels many-flowered, usually drooping ..... 6. *sonchifolia.*

Panicles large, spreading, up to 10 in. long, longer in fruit when the pedicels elongate, many-branched; leaves coriaceous, oblanceolate, acute at apex, rounded and more or less auricled at base, up to 12 in. long, 2·5 in. broad, whorled at the base of the panicle, not dotted with glands near the margin.....7. *missionis.*

Calyx-lobes large and broad, clearly overlapping to the right, rounded

at tip, ciliate; inflorescence lateral or axillary, rarely subterminal; leaves entire, minutely dotted, glabrous:—

Anthers septate: leaves succulent-coriaceous, obovate, obtusely acute, up to 5 in. long, 2 in. broad; umbellate racemes on peduncles about 1 in. long; corolla-lobes obliquely ovate-acuminate, gland-dotted ..... 8. *littoralis.*

Anthers not septate; leaves subcoriaceous, obovate or oblanceolate, obtusely acuminate, up to 10 in. long, 3 in. broad; umbellate racemes on peduncles about 2 in. long; corolla-lobes ovate, rounded or slightly acute, gland-dotted ..... 9. *solanacea.*

1. ARDISIA RHOMBOIDEA, Wt. Ic. t. 1213; F. B. I. iii. 529.
   W. Ghâts, Anamalai Hills and hills of Travancore and Tinnevelly, at 2,000–6,000 ft., in evergreen forests.
   A glabrous shrub or small tree with pinkish-white flowers.
2. ARDISIA PAUCIFLORA, Heyne; F. B. I. iii. 529; Wt. Ic. t. 1214.
   W. Ghâts, evergreen forests from the Wynaad southwards, up to 5,000 ft., common; Brumagiri Hills of Mysore.
   A small tree with white flowers and red berries.
3. ARDISIA DEPRESSA, C. B. Clarke; F. B. I. iii. 522.
   E. Ghâts, Hills of Vizagapatam, at 4,000–5,000 ft. (A. W. Lushington).
   A large shrub with pinkish flowers.
4. ARDISIA BLATTERI, Gamble in Kew Bull. 1921, 121.
   W. Ghâts, "High Wavy Mountain," Madura, at 4,000–5,500 ft. (Blatter and Hallberg), hills of Travancore, at 2,000–4,000 ft.? (Bourdillon).
   A small tree with prominently nerved leaves, pink flowers and black berries.
5. ARDISIA AMPLEXICAULIS, Bedd. Ic. t. 170; F. B. I. iii. 521.
   W. Ghâts, Tirrihoot Hills, Wynaad, at 3,000–4,000 ft. (Beddome); Hills of Travancore (Barber).
   A glabrous
6. ARDISIA S OLI Mez Monog. Myrs. 116. *A. villosa*, var. *obtusa*, C. B. Cl ; F. B. I 525.
   W. Ghâts, Anamalai Hills, at 4,000 ft. (Beddome, Barber), Sivagiri Hills of Tinnevelly (Wight).
   Apparently a small tree, with remarkable many-flowered umbels in dichotomous drooping panicles.

.. ARDISIA MISSIONIS, Wall.; F. B. I. iii. 519. *A. courtallensis*, Wt. Ic. t. 1215; F. B. I. iii. 520.

W. Ghâts, S. Canara to Travancore, in evergreen forests.

A small tree with pale pink flowers and red berries, in large panicles.

8. ARDISIA LITTORALIS, Andr. Repos. x. t. 630. *A. polycephala*, Wt. Ill. t. 145 *not of* Wall. *A. humilis*, C. B. Clarke; F. B. I. iii. 529, *not of* Vahl *and in part only*.

W. Coast, along backwaters in Travancore.

A somewhat succulent shrub reaching about 3 ft. in height, with rose-coloured flowers, the berries red at first turning purplish black.

9. ARDISIA SOLANACEA, Roxb. Cor. Pl. t. 27. *A. humilis*, A. DC.; C. B. Clarke in F. B. I. iii. 529, *in part only*; Wt. Ic. t. 1212, *not of* Vahl.

All Forest Districts in the Circars, Deccan and Carnatic, usually in moist places and along streams, up to 5,000 ft. in the hills; also in evergreen forests of the W. Ghâts, but less common.

A large shrub or small tree with pink flowers and black berries. Bark brown, smooth; wood grey, moderately hard, with broad medullary rays. Vern. *Hind.* Bisi; *Ur.* Kadna, Katapenga; *Tel.* Konda mayur.

5. Antistrophe, A. DC.

Slender shrubs, the branchlets pubescent. *Leaves* alternate, lanceolate, acuminate, entire or dentate. *Flowers* hermaphrodite, in subsessile axillary umbels or solitary; pedicels slender; bracts small. *Calyx* 5-lobed, persistent. *Corolla* deeply 5-cleft; lobes lanceolate acuminate, overlapping to the left in bud. *Stamens* 5, on the throat of the corolla; filaments short; anthers free, lanceolate, opening longitudinally, the connective produced upwards in a membranous wing. *Ovary* ovoid; ovules several, on a globose central placenta; style filiform; stigma punctiform. *Fruit* a globose berry; pericarp coriaceous; endocarp chartaceous. *Seed* 1; albumen ruminate; embryo cylindric, transverse.

ANTISTROPHE SERRATIFOLIA, Hook. f.; F. B. I. iii. 532. *Ardisia serratifolia*, Bedd. Ic. t. 113.

Anamalai Hills, at 3,000 ft. (Beddome).

An erect shrub with rusty-villous branchlets, lanceolate, long acuminate leaves with prominent saw-tooth-like serratures and many (about 25) pairs of prominent parallel nerves, up to 8 in. long, 2 in. broad, and few-flowered axillary umbels of flowers.

6. Aegiceras, Gaertn.

Sea-coast shrubs or small trees; branches glabrous. *Leaves* coriaceous, entire, glabrous, alternate, petioled. *Flowers* hermaphrodite, white, in terminal or axillary umbels or panicles, pedicels slender; bracts 0. *Calyx* of 5 imbricate lobes, the lobes twisted to the left, overlapping to the right. *Corolla*-tube short, villous; lobes 5, overlapping to the right in bud, afterwards recurved. *Stamens* 5, on the corolla-tube: filaments linear, connate below and villous; anthers cordate-lanceolate, transversely septate. *Ovary* fusiform, narrowed into an elongate style; stigma small; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, coriaceous, at length splitting longitudinally. *Seed* elongate, exalbuminous; radicle inferior, enlarged at base; cotyledons short; germination often taking place while still on the plant.

AEGICERAS CORNICULATUM, Blanco. *Ae. majus*, Gaertn.; F. B. I. iii. 533; Wt. Ill. t. 146.

Sea-coasts, both E. and W., in mangrove forests especially, and along tidal creeks.

A common and pretty small tree or large shrub with obovate emarginate coriaceous shining leaves, white flowers and an elongate curved fruit about 1 in. long. Bark grey; wood reddish-brown, often streaked with yellow, even-grained, mostly used for fuel. Vern. *Hind.* Halsi; *Tel.* Dudumara, Guggilam; *Tam.* Narikandam.

Family XCIV. SAPOTACEAE.

Trees or shrubs, generally evergreen, young parts often rusty-tomentose. *Leaves* alternate, rarely subopposite, entire, petioled stipules 0 or very caducous. *Flowers* hermaphrodite, axillary; pedicels clustered, rarely solitary or panicled; bracts 0, bracteoles 0 or minute. *Calyx*-lobes 4-8, imbricate or biseriate with the

outer ones valvate. *Corolla*-tube short; lobes as many or 2–4 times as many as those of the calyx. *Stamens* inserted on the corolla-tube, as many as the lobes and opposite to them or 2–3 times as many, 1–3-seriate; filaments usually short; anthers lanceolate, the connective often produced; staminodes when present alternate with the stamens. *Ovary* superior, sessile, 2–8-celled; ovules solitary in each cell, attached to the inner angle; style subulate. *Fruit* an indehiscent 1–8-seeded berry. *Seeds* if single ellipsoid, if more compressed; hilum conspicuous; testa usually crustaceous, shining; exalbuminous with large fleshy cotyledons or albuminous with flat cotyledons; radicle inferior.

Calyx-lobes 1-seriate, imbricate; stamens 5–6:—
Staminodes 0; leaf main-nerves close and parallel
1. **Chrysophyllum.**
Staminodes present; leaf main-nerves distant, few
2. **Sideroxylon.**

Calyx-lobes 2-seriate, outer series valvate:—
Calyx-lobes 4:—
Seeds albuminous; stamens 8 ..... 3. **Isonandra.**
Seeds exalbuminous; stamens 12 or more ..... 4. **Bassia.**
Calyx-lobes 6–8:—
Staminodes 0; seeds exalbuminous ..... 5. **Palaquium.**
Staminodes present; seeds albuminous ..... 6. **Mimusops.**

1. Chrysophyllum, Linn.

Trees with milky juice. *Leaves* subcoriaceous, main nerves usually very many, slender, parallel; stipules 0. *Flowers* small, in axillary fascicles, hermaphrodite. *Calyx* 5–6-lobed, the lobes subequal, imbricate. *Corolla* tubular-campanulate, 5–6-lobed, the lobes entire, imbricate. *Stamens* equal in number to, and opposite to, the corolla-lobes; filaments subulate; anthers ovate; staminodes 0. *Ovary* villous, 5–6-, rarely more -celled; ovules 1 in each cell, attached to the central placenta; style glabrous. *Fruit* a fleshy or coriaceous globose berry. *Seeds* large, flattened; testa very hard, with a conspicuous elongate hilum; albumen fleshy; cotyledons flat.

CHRYSOPHYLLUM ROXBURGHII, G. Don; F. B. I. iii. 533; Bedd. Fl. t. 236.

N. Circars. Rumpa Hills of Godavari; Hills of W. Mysore;

W. Ghâts, Anamalais and hills of Travancore, up to 4,000 ft., in evergreen forests. The Star Apple.

A lofty evergreen tree with shining closely nerved leaves, small greenish white flowers and large yellowish-green berry with hard flat polished brown seeds. Bark dark grey, smooth; wood greyish-white, cross-grained, not durable. Vern. *Tam.* Kappalei; *Mal.* Atha; *Mar.* Tarsi.

C. Cainito, Linn., the West Indian Star Apple, is occasionally found in gardens and has an edible fruit and pretty leaves covered beneath with golden silky pubescence.

Achras Sapota, Linn. The Sapota or Sapodilla plum is a large tree, sometimes cultivated for its edible fruit.

2. Sideroxylon, Linn.

Trees, rarely shrubs, sometimes thorny, the spines being arrested branchlets. *Leaves* alternate; stipules 0. *Flowers* small, in fascicles in the axils of the leaves or of the scars of fallen leaves, subsessile or shortly pedicelled. *Calyx* of 5–6 imbricate subequal segments. *Corolla* campanulate; lobes 5–6, imbricate. *Stamens* as many as the corolla-lobes and opposite to them, attached to the tube or at its base; filaments linear, anthers ovate or lanceolate, extrorse; staminodes alternating with the stamens. *Ovary* usually villous, with 5 or fewer cells; ovules on axile placentas; style cylindric; stigma small. *Fruit* an ovoid or globose fleshy berry, 5 or less-seeded. *Seeds* usually solitary; testa hard, with a prominent oblong or linear hilum; albumen fleshy; embryo with foliaceous or fleshy cotyledons.

SIDEROXYLON TOMENTOSUM, Roxb. Cor. Pl. t. 28; F. B. I. iii. 538.

N. Circars, Ganjam to Godavari, up to 4,500 ft. on Mahendragiri, Hills of Canara to Coimbatore, in dry forests.

A small tree, thorny and with small leaves in dry localities, in wet ones with larger and thinner leaves and few or no thorns. Bark thin, cracked; wood yellowish-brown, moderately hard. Vern. *Ur.* Kanta bohul.

Var. *elengioides*, Gamble. *Sapota elengioides*, A. DC. Wt. Ic. t. 1218. *Achras elengioides*, Bedd. Fl. t. 235.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 5,000 ft., in Shola forests.

A small tree with rather long thorns and small leaves which are bright red in colour when young. The fruit is used in pickles and curries. Bark rough, much cracked; wood yellowish-brown, hard. Vern. *Tam.* Palei; *Badaga*, Holay.

3. Isonandra, Wight.

Trees with milky juice. *Leaves* alternate, entire, main nerves prominent. *Flowers* small, in clusters in the axils of present or fallen leaves, subsessile or shortly pedicelled. *Calyx*-lobes 4, 2-seriate. *Corolla* tubular campanulate; lobes 4, imbricate, somewhat twisted. *Stamens* 8, subequal, attached near the base of the corolla, 1-seriate; filaments erect; anthers lanceolate sagittate, staminodes 0. *Ovary* 4-celled, villous; style linear. *Fruit* an ellipsoid or oblong berry with a fleshy pericarp; seed usually 1 only, flattened; testa crustaceous, shining, hilum lateral; albumen fleshy; cotyledons flat, radicle inferior.

Branchlets very stout; leaf-petioles scarcely ·1 in. long, leaves broadly obovate, glabrous, rounded or emarginate at apex, rounded at base, up to 3·5 in. long, 2·5 in. broad, main nerves regular parallel about 12-15 pairs, transverse nervules irregular, reticulation areolate; anthers very obtuse ..... 1. *villosa*.

Branchlets stout; leaf-petioles ·3 in. long or longer:—

Leaves obovate, obtuse or slightly emarginate at apex; transverse nervules not or only slightly parallel, inconspicuous; anthers apiculate:—

Leaves up to 5 in. long, 2·5 in. broad, cuneate at base, main nerves regular, distant, 6–8 pairs ..... 2. *Stocksii*.

Leaves up to 2 in. long, 1 in. broad, cuneate at base, margin recurved; main nerves 4–6 pairs ..... 3. *montana*.

Leaves elliptic, obtuse or obtusely acute or emarginate, up to 3 in. long, 1·5 in. broad, the margins very slightly recurved; main nerves 8–10 pairs, regular and parallel, transverse nervules fairly distinct and subparallel; anthers with black-hispid tips 4. *Candolleana*.

Leaves oblanceolate, obtusely acute, up to 4 in. long, 1 in. broad, the margins much recurved, main nerves 10–12 pairs, regular, transverse nervules faint; anthers with the tip sometimes villous only ..... 5. *Perrottetiana*.

Branchlets slender; leaf-petioles ·2 ·5 in. long; leaves lanceolate oblanceolate or oblong, obtusely-, often long—and often abruptly—

acuminate at apex, cuneate at base, up to 15 in. long, 3 in. broad, but usually shorter and narrower; main nerves 10–13 pairs, transverse nervules close and fairly regularly and prominently subparallel; anther tips apiculate.....6. *lanceolata*

1. ISONANDRA VILLOSA, Wt. Ic. t. 360; F. B. I. iii. 538.
   Deccan, Veligonda Hills of Nellore (Ramaswami); Kambakam Hills of Chingleput; W. Coast, Quilon (Wight).
   A tree with thick branchlets and very coriaceous leaves, quite glabrous in spite of its name.
2. ISONANDRA STOCKSII, C. B. Clarke; F. B. I. iii. 539.
   Deccan, N. Coimbatore, in Shola forests (Fischer).
   Apparently a small tree.
3. ISONANDRA MONTANA, Gamble n comb. *I. Wightiana*, A. DC. var. *montana*, Thw.; F. B. I. iii. 540.
   W. Ghâts, hills of Travancore, in evergreen forests, above 4,000 ft. (Bourdillon).
   A small tree with small leaves, the margins recurved.
4. ISONANDRA CANDOLLEANA, Wt. Ic. t. 1220; F. B. I. iii. 539.
   W. Ghâts, Nilgiris and Pulneys and hills of Travancore, at about 4,000–6,000 ft., in Shola forests.
5. ISONANDRA PERROTTETIANA, Wt. Ic. t. 1219; F. B. I. iii. 539.
   W. Ghâts, Nilgiri Hills, in Shola forests, above 4,000 ft.
6. ISONANDRA LANCEOLATA, Wt. Ic. t. 350; F. B. I. iii. 539.
   W. Ghâts, all Districts from the Wynaad southwards, in evergreen forests at about 3,000–5,000 ft.
   A small tree with chartaceous leaves and prominently transverse nervules, the branchlets, buds and sometimes the under side of the leaves rusty-silky. The fruits are elongate, orange-scarlet

Var. *anfractuosa*, C. B. Clarke. Leaves larger, more prominently obovate and acuminate, the transverse nervules usually curved to cross the main nerves; calyx- and corolla-lobes more acute.

Ataṗadi Hills of Malabar at 3,000 ft., Anamalai Hills and Hills of Cochin.

Isonandra diplostemon, C. B. Clarke in F. B. I. iii. 540. *Diospyros obovata*, Wt. Ic. t. 1226. Resembles *I. villosa*, Wt. more or less, in its leaves, but the flowers are curious, having 4 calyx-lobes as in *Isonandra*, but 6 small nearly free petals and

about 3 stamens to each petal. Wight's specimens are still the only ones known and the locality is not specified.

4. Bassia, Linn.

Trees with milky juice. *Leaves* coriaceous or chartaceous, petioled, usually clustered at the ends of the branchlets; stipules caducous. *Flowers* fascicled, crowded near the tops of the branches among the leaves or from the scars of fallen leaves; pedicels frequently reflexed. *Calyx*-lobes 4, rarely 5, the 2 outer usually valvate enclosing the 2–3 inner imbricate. *Corolla* campanulate, tube broad; lobes 6–12, usually 8–10, contorted in bud, erect in flower. *Stamens* at least twice as many as the corolla-lobes, in one or more rows on the corolla-tube; filaments usually short; anthers lanceolate, the connective produced; staminodes 0. *Ovary* villous, 4–12-, but usually 6- or 8-celled; style subulate, elongate. *Fruit* a globose oblong or ovoid, fleshy, usually 1–3-seeded, berry. *Seeds* ellipsoid, more or less compressed; testa crustaceous, shining; hilum oblong or linear; albumen 0; cotyledons thick, fleshy; radicle small.

Pedicels stout, fulvous tomentose, 1–1·5 in. long; calyx-lobes also fulvous-tomentose:—

Anthers long-hairy on the back, obtuse at base, connective long-apiculate; leaves coriaceous, elliptic, up to 9 in. long, 4–5 in. broad, with about 12 pairs of main nerves, petioles long .....1. *latifolia*

Anthers not long-hairy on the back, cordate at base, connective long-apiculate; leaves membranous, oblanceolate, tapering at base into a short fulvous-hairy petiole, the back also fulvous-hairy along the midrib, up to 12 in. long, 3 in. broad, with 20–25 pairs of main nerves .....2. *Bourdillonii*.

Pedicels glabrous:—

Pedicels slender, up to 2·5 in. long; calyx-lobes rusty-pubescent; anthers hairy on the back, cordate at base, the connective apiculate, often minutely 3-toothed; leaves chartaceous, linear-lanceolate or oblong-lanceolate, up to 7 in. long, 1·75 in. broad, with slender petioles, main nerves about 12–15 pairs..... 3. *longifolia*.

Pedicels moderately stout, ·5–·75 in. long; calyx-lobes glabrous or nearly so; anthers glabrous, the filaments hairy, the connective long-apiculate; leaves coriaceous, shining, linear-oblong or oblanceolate, obtuse, tapering to the petiole, up to 8 in. long, 2·5 in broad; main nerves 20 or more pairs .....4. *malabarica*.

1. Bassia latifolia, Roxb. Cor. Pl. t. 19; F. B. I. iii. 544; Bedd. Fl. t. 41.

N. Circars, in deciduous forests, especially in Godavari; Deccan, in deciduous forests, especially the Nallamalai Hills and south to N. Arcot, Salem and Coimbatore. Elsewhere much planted and liable to run wild. The Mahua tree.

A large and handsome deciduous tree, one of the most important, in some respects the most important, of Indian trees. The large fleshy cream-coloured corollas contain much sugar and are an important article of food, and for the distillation of spirit. They fall readily from the trees when ripe, and can be collected under them. The large ovoid greenish fruits have large fleshy cotyledons which give a valuable oil. Bark thick, grey; wood very hard, reddish-brown, of good quality, but little used. Vern. *Hind.* Mahua; *Ur.* Moha, Moholo; *Tel.* Ippa; *Tam.* Illupei; *Kan.* Ippi.

2. Bassia Bourdillonii, Gamble in Kew Bull. 1921, 121. *B. fulva*, Bourd. Trav. Trees, 238, *not of* Bedd.

W. Ghâts, Ariankavu and Shendurni valleys of Travancore, at low levels up to 1,000 ft. (Bourdillon).

A medium-sized tree with large yellowish-white corollas, large leaves in close terminal whorls and a large green ovoid fruit. Bark greyish-brown; wood pinkish-brown, moderately hard, apparently of good quality. Vern. *Mal.* Thandidiyan.

3. Bassia longifolia, Linn.; F. B. I. iii. 544; Wt. Ill. t. 147 Bedd. Fl. t. 42.

W. Coast, dry forests of S. Canara, Malabar and Travancore, at low elevations; elsewhere, especially in the Carnatic, cultivated only.

A large tree, the flowers appearing with the leaves, corollas pale yellow and fleshy, with the same uses as with *B. latifolia*, as is also the case with the seeds. Bark dark yellowish-grey; wood red, close-grained, similar to that of Mahua. Vern. *Tel.* Ippa; *Tam.* Illupei; *Kan.* Ippi; *Mal.* Ellupi.

4. Bassia malabarica, Bedd.; F. B. I. iii. 544.

W. Coast and W. Ghâts, along streams, from S. Canara to

Travancore and Tinnevelly. Mysore hills and Anamalais, up to 4,000 ft.

A large tree with yellowish white flowers and oblong-lanceolate fruit. Bark dark brown; wood dark red, hard. Vern. *Tam.*, *Mal.* Atta illupei.

5. Palaquium, Blanco.

Trees with milky juice. *Leaves* usually coriaceous, petioled, entire. *Flowers* fascicled in the axils of the leaves or of the scars of fallen leaves, pedicellate. *Calyx*-lobes 6, in 2 series, the outer 3 valvate, the inner 3 imbricate. *Corolla* campanulate, tube short, lobes 6, imbricate or contorted in bud. *Stamens* 12 or more, up to 18, attached to the base of the corolla, 1-seriate or the alternate ones rather higher up; anthers ovate-lanceolate, extrorse, the connective produced; staminodes 0. *Ovary* villous, 6-celled; style subulate. *Fruit* a fleshy ovoid or ellipsoid berry, 1-2-seeded. *Seeds* large; testa crustaceous, albumen 0; cotyledons thick, fleshy.

Leaves elliptic or elliptic-obovate, up to 4 in. long, 2 in. broad, shortly and obtusely acute the apex twisted, dark green when fresh, nearly black when dry; pedicels 1–1·5 in. long, usually single or in pairs; corolla ·5 in. long; anthers long-apiculate, hairy at top
1. *ellipticum*.

Leaves lanceolate or oblanceolate, up to 8 in. long, 3 in broad, shortly and obtusely acute, light green when fresh, grey when dry; pedicels up to ·5 in. long, single or in pairs; corolla about ·25 in. long; anthers acute, not hairy at tip .... 2. *Bourdillonii*

1. PALAQUIUM ELLIPTICUM, Engler. *Dichopsis elliptica*, Benth., F. B. I. iii. 542. *Bassia elliptica*, Dalz.; Bedd Fl. t. 43

W. Ghâts, in all Districts, in evergreen forests, at 1,000-4,000 ft.

A lofty tree sometimes reaching 100 ft. in height with a straight but fluted stem, the flowers white and fragrant, the berry up to 1·5 in. long, ellipsoid, green. Bark brown, mottled with white; wood reddish-brown, moderately hard, used in building but especially for shingles. It gives a poor quality of gutta percha of little value. Vern. *Tam.* Kat illupei, *Mar.* Panchoti, *Mal.* Pala

2. PALAQUIUM BOURDILLONI, Brandis in Ind. Trees, 424.
Travancore, in evergreen forests, up to 4,000 ft. (Bourdillon).
A medium-sized tree.

6. Mimusops, Linn.

Trees with milky juice. *Leaves* chartaceous or coriaceous, with many usually inconspicuous parallel main nerves. *Flowers* axillary, pedicelled, solitary or fascicled. *Calyx*-lobes 6 or 8, in 2 series, the outer valvate enclosing the inner imbricate. *Corolla*-tube short; lobes 18 or 24 or more in 2 rows, one-third in the inner, the rest in the outer row. *Stamens* 6 or 8 attached to the corolla-tube opposite the inner lobes; filaments short, free or connate in a tube with the staminodes, anthers lanceolate, extrorse, apiculate; staminodes subpetaloid, usually fimbriate. *Ovary* hirsute, 6–8-celled; style subulate. *Fruit* a globose ovoid or ellipsoid berry, epicarp crustaceous. *Seeds* few or solitary, obliquely ovate or oblong, slightly compressed; hilum basal or lateral; albumen fleshy; cotyledons flat.

Calyx-lobes 8, stamens 8; staminodes lanceolate, acuminate, fimbriate, pilose; leaves chartaceous or coriaceous, elliptic, shortly acuminate at apex, rounded or narrowed at base, glabrous, up to 7 in. long, 3 in. broad, but usually smaller; berry ovoid, yellow, about 1 in. long ..... 1. *Elengi.*

Calyx-lobes 6, stamens usually 6, sometimes 8; leaves coriaceous:—
Flowers small, the corolla under ·2 in. long; staminodes short, glabrous, lanceolate, bifid or fimbriate; leaves elliptic-obovate, obtuse or emarginate, up to 4 in. long, 2 in. broad; berry ellipsoid, reddish-yellow, about ·4 in. long ..... 2. *hexandra.*
Flowers rather large, the corolla ·4 in. long; staminodes long lanceolate, fimbriate, glabrous; leaves elliptic, obtuse or emarginate, up to 2·5 in. long, 1·5 in. broad; berry globose, depressed about ·75 in. long ..... 3. *Roxburghiana*

1. MIMUSOPS ELENGI, Linn.; F. B. I. iii. 548; Roxb. Cor. Pl. t. 14; Wt. Ic. t. 1586; Bedd. Fl. t. 40.
Carnatic, in dry evergreen forests from the Kistna southwards, common; Deccan, in ravines in the hills and up to 4,000 ft.; W. Coast and lower Ghâts, in moist evergreen forests, scarce; common everywhere in cultivation.

A small tree with rather small leaves scarcely 3 in. long in dry forests, a large one with much larger leaves in damp localities. Bark dark grey, rough, deeply fissured; wood dark red, very hard and close-grained, used for building, carts and implements. The scented white corollas which fall off in showers are made into garlands. The seeds give an oil. Vern. *Hind.* Malsari; *Ur.* Kirakuli; *Tel.* Pogada; *Tam.* Mahila, magadam; *Mal.* Elengi.

2. MIMUSOPS HEXANDRA, Roxb. Cor. Pl. t. 15; F. B. I. iii. 549. *M. indica*, A. DC.; Wt. Ic. t. 1587.

N. Circars and Carnatic from the Chilka Lake southwards, chiefly in dry evergreen forests, inland to the scarp of the Deccan plateau, more scarce to the westward and absent from the W Coast.

A small tree in dry evergreen forests as in India, a large tree in Ceylon. Bark grey, smooth, often with conical hard degenerate branchlets; wood red, very hard and close-grained. Vern. *Ur.* Khiri; *Tel.* Pala; *Tam.* Palla.

3. MIMUSOPS ROXBURGHIANA, Wt. Ic. t. 1588; F. B. I. iii. 548.

Deccan and Carnatic, in dry forests as in the Yerramalai Hills of Kurnool, the hills of N. Coimbatore and N. Nilgiri slopes, southwards to Tinnevelly and in Travancore in the southern forests, up to 5,000 ft.

A large evergreen tree. Wood reddish-brown and strong, used in building. Vern. *Tam.* Kanapalei; *Kan.* Renga.

M. Kauki, Linn., is a tree of the Malay Peninsula, sometimes found in gardens.

Family XCV. EBENACEAE.

Trees or shrubs, usually with hard wood, often black in the centre. *Leaves* alternate, rarely subopposite, entire, usually coriaceous, stipules 0. *Flowers* usually dioecious, regular, axillary, cymose or solitary, bracteate; pedicels articulate under the flower. *Calyx* inferior, gamosepalous, often accrescent. *Corolla* gamopetalous, lobes 3–7, contorted, sometimes imbricate or valvate in bud. *Stamens* in ♂ flowers as many or 2–3-times as many as the corolla-lobes or ∞; filaments free or paired or variously connate; anthers basifixed usually dehiscing longi-

tudinally, rarely apically, connective often produced; in ♀ flowers absent or reduced to staminodes. *Disk* usually 0. *Ovary* superior, sessile; styles 2–8; ovules as many or twice as many as the styles, attached to the inner angles of the cells; in ♂ flowers 0 or rudimentary. *Fruit* a coriaceous or fleshy berry, several- or few-seeded. *Seeds* pendulous, usually oblong; testa thin or coriaceous; albumen copious, uniform or ruminate: embryo axile; radicle superior.

Flowers 3-merous; ovary 3- or 6-celled ..... 1. **Maba.**
Flowers 4–5-merous; ovary 4–5- or 8–10-celled..... 2. **Diospyros.**

1. **Maba,** Forst.

Trees or shrubs. *Leaves* alternate, entire. *Flowers* dioecious, axillary, shortly pedicelled or in small dense cymes, usually 3- rarely 4- or 5-merous. *Calyx* 3-, rarely 4–5-lobed, often cup-shaped enlarged in fruit. *Corolla*-tube usually longer than the calyx, lobes 3, twisted to the right in bud. *Stamens* in ♂ flowers 3–22; filaments distinct, paired or polyadelphous; in ♀ flowers 0 or up to 12 staminodes. *Ovary* in ♀ flowers 3-celled or imperfectly 6-celled, ovules 6; style-arms 3; in ♂ flowers rudimentary only. *Fruit* globose or ellipsoid, glabrous or hairy; 1–6-celled and 1–6-seeded, dry or fleshy. *Seeds* albuminous, the albumen equable; embryo axile; cotyledons flat.

Fruit globose, glabrous; branchlets glabrous:—
Flowers minute, calyx ·1 in. long, corolla of ♂ ·15 in., of ♀ ·2 in. long; leaves obovate, coriaceous, rounded or emarginate at apex, under 1 in. long; fruit ·3–·4 in. in diam., 1–2-seeded; stamens usually 6, anthers lanceolate ..... 1. *buxifolia.*
Flowers small but larger, calyx ·2 in. long, corolla of ♂ or ♀ ·3–·4 in. long; leaves elliptic-lanceolate, chartaceous, acuminate usually obtusely at apex, 1–3 in. long; fruit ·4–·5 in. in diam., 1–3-seeded; stamens 6–10, anthers linear ..... 2. *neilgerrensis.*
Fruit ellipsoid, with fulvous hairs when young; branchlets fulvous-hairy as are the calyx- and corolla-lobes on the back; calyx ·2 in. long, corolla of ♀ 3 in.; leaves elliptic-lanceolate, coriaceous, obtusely acute at apex, 1–3 in. long, ·5–1 in. broad; fruit ellipsoid, fulvous hairy when young ..... 3. *nigrescens.*

1. MABA BUXIFOLIA, Pers.; F. B. I. iii. 551; Wt. Ic. t. 763. *Ferreola buxifolia*, Roxb. Cor. Pl. t. 45.
   N. Circars and Carnatic to S. Travancore, especially near the coast and on laterite, common in dry evergreen forests; Deccan, in dry forests in Kurnool, Cuddapah, N. Arcot and S. Arcot, more scarce westwards.
   A large bushy shrub or more rarely a small tree, with red fruit. Bark thin, grey to black; wood grey with darker streaks, hard and close-grained. Vern. *Ur* Gwakoli; *Tel.* Alli, Uti; *Tam.* Iramballi.
2. MABA NEILGERRENSIS, Wt. Ill. t. 148 *bis* E, Ic. tt. 1228, 1229. *M. buxifolia*, C. B. Clarke; F. B. I. iii. 551, *in part, not of* Pers.
   W. Ghâts, Nilgiris, Pulneys and hills of Tinnevelly, at 5,000–6,000 ft., in Shola forests; hills of N Coimbatore.
   A small tree.
3. MABA NICRESCENS, Dalz.; F. B. I. iii. 551.
   W Ghats, hills of S. Canara and Mysore (Law).
   A large shrub or small tree.

2. Diospyros, Linn.

Trees, rarely shrubs. *Leaves* alternate or sometimes sub-opposite, entire. *Flowers* dioecious, rarely polygamous, axillary or on old branches, in cymes or, especially the ♀, solitary; usually 4–5-merous, rarely 3-merous; bracts, sometimes conspicuous. *Calyx* lobed, usually deeply, rarely truncate, the ♀ often larger than the ♂ and often accrescent and plicate or auriculate in fruit. *Corolla* tubular urceolate campanulate or salver-shaped, the lobes twisted to the right in bud. *Stamens* in ♂ flowers 4–many, often 16, the filaments distinct, paired or variously connate; anthers usually linear or lanceolate, rarely short; in ♀ flowers staminodes 0–16. *Ovary* in ♀ 4–5-celled or sometimes 8–10-celled, ovules solitary, rarely 2 in each cell; styles or stigmas 1–4; in ♂ flowers rudimentary or 0. *Fruit* globose ellipsoid or ovoid-conic, often supported by the enlarged sometimes woody calyx; flesh often pulpy or viscid. *Seeds* oblong, usually compressed, albumen equable or ruminate; cotyledons thin, flat.

Seeds with ruminate albumen :—

Calyx-lobes of ♀ flowers 4–5, cordate, the margins wavy, forming in fruit a very shallow cup : leaves alternate or subopposite ; ♂ flowers in short cymes densely tawny-tomentose, ♀ solitary ; fruit globose :—

Leaves elliptic, narrowed at both ends, nerves and reticulations raised above, up to 6 in. long, 2·5 in. broad, but irregular, those of coppice shoots up to 15 in. by 6 in. ; fruit pubescent when young, afterwards glabrous, with crustaceous pericarp ; seeds oblong, compressed, ·6–·7 in. long ..... 1. *Melanoxylon.*

Leaves broadly ovate, rounded at base, obtuse or slightly acute at apex, nerves and reticulations of mature ones prominently impressed above, up to 8 in. long, 3–4 in. broad ; fruit glabrous, the pericarp leathery ; seeds shortly oblong, slightly compressed, ·5 in. long 2. *tomentosa.*

Calyx-lobes of ♀ flowers 4, having the tube enlarged in fruit in a large woody cup, the lobes reflexed, wavy ; ♂ flowers in clusters, ♀ 1–3 together ; fruit ovoid-globose, 1·5 in. in diam. ; leaves large, coriaceous oblong-lanceolate, acuminate, up to 12 in. long, 3–6 in. wide, the transverse nervules prominent and subparallel 3. *insignis.*

Calyx-lobes of ♀ flowers 4, rounded, reflexed and accrescent in fruit, not wavy ; of ♂ very small ; ♂ flowers in cymes about ·5 in. long, ♀ solitary (sometimes apparently racemose, by the absence of leaves) ; fruit globose, ·5 in. in diam. ; seeds boat-shaped ; leaves elliptic, black when dry, shining, acute or acuminate, up to 7 in. long, 3·5 in. broad ..... 4. *sylvatica.*

Calyx-lobes of ♀ flowers 5, ovate, the margins strongly reflexed, accrescent in fruit, not wavy, of ♂ small, acute :—

♂ flowers as well as ♀ in close axillary fascicles, densely tawny-tomentose ; fruit ovoid, pointed, ·75 in. long, seeds oblong, shining, wrinkled, ·5 in. long ; leaves elliptic oblong, shortly and obtusely acuminate, coriaceous, the nerves inconspicuous, 3–8 in. long, 1·5–3 in. broad ..... 5. *Candolleana.*

♂ flowers in few-flowered pedunculate cymes, ♀ solitary, pedunculate, both nearly glabrous ; fruit globose, 1 in. in diam. ; seeds ovoid, shining, transversely striate ; leaves narrowly elliptic-oblong, obtusely acute at apex, narrowed at base, coriaceous, shining, up to 3·5 in. long, 1·5 in. broad ..... 6. *affinis.*

Seeds with the albumen not ruminate :—

Calyx only shortly lobed, often truncate in fruit :—

Calyx-lobes of ♂ and ♀ similar, short, obtuse and ciliate :—

Calyx-lobes of ♀ not enlarged in fruit, but still lobed ; branchlets

pubescent; leaves elliptic or lanceolate, obtusely acuminate, membranous, rounded at base, up to 4 in. long, 1·5 in. broad, nerves not prominent, 6–8 pairs, petiole ·1–·2 in. long; fruit globose or ovoid .....7. *humilis.*

Calyx-lobes of ♀ enlarged in a truncate cup; branchlets glabrous; leaves ovate, obtusely acuminate, chartaceous, the base narrowed or broadly obtuse or subcordate, up to 5 in. long, 3 in. broad, nerves about 6–8 pairs spreading, petiole ·3–·5 in. long; fruit oblong-ellipsoid.....8. *oocarpa.*

Calyx-lobes of ♂ very short, of ♀ much enlarged in fruit, coriaceous and folded; branchlets appressed pubescent; leaves lanceolate, the apex abruptly but obtusely produced, the base acute, coriaceous, minutely reticulate, up to 3 in. long, 1 in. broad, petiole ·2–·3 in. long; fruit globose, pubescent 9. *Barberi.*

Calyx deeply lobed :—

Fruit ovoid-conical, fulvous hirsute; calyx-lobes nearly free, ♂ and ♀ similar, recurved in fruit; branchlets fulvous-hirsute; leaves elliptic or elliptic-oblong, acute, membranous, rounded or cordate at base, fulvous-hirsute beneath, up to 5 in. long, 2 in. broad, petiole ·15 in. long .....10. *pruriens.*

Fruit globose or ovoid :—

Flowers peduncled, ♂ in cymes, ♀ solitary; calyx-lobes accrescent, large and foliaceous in fruit, ovate-cordate :—

Cymes of ♂ flowers lax with slender peduncles and pedicels, flowers 4-merous; anthers 12–16, elongate apiculate, in pairs on a disk surrounding the rudimentary ovary; leaves narrowly lanceolate, obtusely acuminate, minutely reticulate, coriaceous, up to 4 in. long, 1 in. broad .....11. *foliolosa.*

Cymes of ♂ flowers stout curved, prominently bracteate; flowers 5-merous; anthers 20, linear, acute, in pairs on the corolla; leaves oblong or oblong-lanceolate, obtusely acuminate, subcoriaceous, minutely reticulate, up to 9 in. long, 3 in. broad .....12. *paniculata.*

Flowers short-peduncled, in close cymes or fascicles :—

Corolla tubular, often salver-shaped :—

Stamens glabrous, anthers many, usually in groups of 3 or more; fruiting calyx-tube forming a woody cup with the lobes beneath recurved :—

Calyx glabrous except for marginal ciliae in ♂; leaves elliptic, obtuse at apex or sometimes emarginate, obtusely attenuate at base, coriaceous, shining, up to 4 in. long,

2 in. broad, reticulation minute and prominent; anther-connective crested or apiculate .....13. *Ebenum.*

Calyx pubescent and ciliate; leaves elliptic-oblong, acuminate, somewhat rounded at base, membranous to chartaceous, up to 6 in. long, 2·25 in. broad, not minutely reticulate, lowest pair of main nerves usually opposite and from the base; anthers with the connective not produced .....14. *assimilis.*

Stamens with the filaments villous, anthers 16, in pairs; leaves lanceolate or oblong-lanceolate, acuminate, attenuate at base, the margins reflexed, coriaceous, up to 6 in. long, 1–2 in. broad, nerves obscure; calyx-lobes with recurved margins .....15. *nilagirica.*

Corolla campanulate or urceolate; stamens 16, in two rows the inner smaller:—

Fruiting calyx large, flattened, coriaceous, foliaceous:—

Leaves ovate or elliptic, 2–6 in. long, 1–3 in. broad, obtuse or subacute at apex, obtuse or sometimes nearly cordate at base, at first pubescent then glabrous; anthers awned; staminodes in ♀ 4; fruit globose, 1–1·5 in. in diam., reddish-brown .....16. *montana.*

Leaves oblong-lanceolate, 1·5–3 in. long, ·5–·75 in. broad, obtuse at apex, rounded or cordate at base, softly pubescent on both sides; anthers not awned; staminodes in ♀ 12; fruit globose, ·5–1 in. in diam., yellow...17. *cordifolia.*

Fruiting calyx small, little enlarged, submembranous:—

Leaves elliptic or obovate, thinly coriaceous, obtuse or subacute at both ends, 1–2·5 in. long, ·5–1 in. broad, slightly pubescent above, fulvous hairy beneath; anthers acute: staminodes in ♀ 8; fruit globose, ·3 in. in diam. 18. *Chloroxylon.*

Leaves elliptic-ovate, acute at both ends, ·75–2 in. long, ·5–1 in. broad, glabrous above, pubescent beneath; anthers ovate, at first dehiscing at the apex, later further down; staminodes in ♀ 0; fruit oblong, ·3–·7 in. long 19. *microphylla.*

Fruiting calyx slightly enlarged, thickened and reflexed in fruit; both ♂ and ♀ flowers clustered on the branchlets, tubular-campanulate, short; leaves elliptic, obtuse, coriaceous, up to 5 in. long, 2·5 in. broad, nerves prominent, irregular; fruit globose, ·7 in. in diam., the reflexed calyx fulvous tomentose .....20. *ovalifolia.*

Corolla ovoid-urceolate; stamens very many, usually about 40, anthers linear, the connective villous also the short filaments; fruiting calyx much enlarged, spreading or reflexed; leaves oblong, very coriaceous, glabrous, the main nerves oblique, reticulation prominent, up to 12 in. long, 3 in. broad; fruit globose, often 3 in. in diam., reddish-velvety.....21. *peregrina.*

Flowers sessile, 5-merous, both ♂ and ♀ in close clusters in the axils of the leaves or of the scars of fallen leaves, surrounded by many bracts, all fulvous-tomentose; stamens 10–12, the anthers lanceolate acuminate; staminodes in ♀ 5; leaves oblong or lanceolate, acuminate, rounded and then decurrent at base, coriaceous, up to 8 in. long, 3·5 broad, the nerves obscure 22. *sulcata.*

Flowers 5-merous, ♂ in short axillary cymes, ♀ in short thick-peduncled and -pedicelled cymose often very dense clusters on old wood; stamens 12–18; staminodes in ♀ 10; leaves oblong-lanceolate, long acuminate, cuneate at base, glabrous, coriaceous, up to 6 in. long, 2 in. broad, main nerves 6–8 pairs, transverse nervules subparallel; fruit globose, very large, 3 in. in diam. 23. *Bourdilloni.*

Calyx spathaceous, irregularly lobed; leaves ovate- or lanceolate-oblong, up to 11 in. long, 4 in. broad, coriaceous, shining, minutely and conspicuously reticulate .....24. *Toposia.*

1. DIOSPYROS MELANOXYLON, Roxb. Cor. Pl. t. 46; F. B. I. iii. 564. *D. dubia*, Wall.; Wt. Ic. t. 1223. *D. exsculpta*, Bedd. Fl. t. 66 (except calyx of ♀). *D. Wightiana*, Wall.; Bedd. Fl. t. 67. *D. Tupru*, Buch.-Ham.; F. B. I. iii. 563.

N. Circars, scarce; Deccan and Carnatic, common, in all deciduous forests, on dry rocky hills and on waste lands, in the hills up to 3,000 ft.

A moderate-sized deciduous tree, the young leaves and branchlets and the ♂ inflorescence tawny-tomentose. Bark greyish-black, cleft in rectangular plates showing the black inner bark in the clefts; wood hard reddish-brown with an irregular black heartwood. This ebony is however not much used, as pieces of it are not obtainable of any large size. The fruit is edible. Vern. *Tel.* Tumi, tumki; *Mar.* Tendu.

2. DIOSPYROS TOMENTOSA, Roxb.; F. B. I. iii. 564; Wt. Ic. tt. 182, 183.

N. Circars down to the Godavari, in deciduous forests.

A large tree in good forests, a small one in scrub jungle, reproducing itself on cultivated lands from root-suckers, the leaves large and thick. Bark greyish-black, cleft in regular scales, the inner bark quite black; wood very hard, dark reddish-brown with an irregular black heartwood, occasionally streaked with purple or brown. The ebony is, however, not much utilised though large trees give good pieces. It is chiefly used for small articles of ornament. The fruit is edible. Vern. *Hind.* Tendu; *Ur.* Kendhu.

3. DIOSPYROS INSIGNIS, Thw.; F. B. I. iii. 565; Bedd Ic. t. 130.
W. Ghâts, Anamalais and hills of Travancore at low elevations in the evergreen forests.
A lofty tree with yellowish-white flowers and large fruit in a curious woody cup.

4. DIOSPYROS SYLVATICA, Roxb. Cor. Pl. t. 47; F. B. I. iii. 559; Bedd. Ic. t. 121.
N. Circars, in forests, down to the Godavari; W. Ghâts, in evergreen forests in all Districts on the W. side, up to 5,000 ft.
A moderate-sized tree with small ♂ flowers having a short urceolate corolla-tube, prominent ♀ calyx-lobes and a small fruit. Bark thin, blackish-grey; wood grey with black streaks and irregular black patches. Vern. *Ur.* Kanchia, Kaluchia; *Tel.* Tella gada; *Kan.* Kaka suroli.

5. DIOSPYROS CANDOLLEANA, Wt. Ic. tt. 1221, 1222; F. B. I. iii. 566. *D. canarica*, Bedd. Ic. t. 134.
N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft.; W. Ghâts, in evergreen forests from S. Canara to Travancore, up to 1,500 ft.
A moderate-sized tree with pale yellow flowers, the ♂ corollas elongate, the fruit green. Bark smooth, greenish-black; wood light pink with grey streaks, no ebony. Vern. *Mal.* Kari; *Mar.* Karamara.

6. DIOSPYROS AFFINIS, Thw.; F. B. I. iii. 566; Bedd. Ic. t. 127.
W. Ghâts, hills of Tinnevelly (Beddome).
A moderate-sized tree with yellowish-white flowers. Bark black, peeling off in irregular patches; wood with small black heartwood streaked with brown.

7. DIOSPYROS HUMILIS, Bourd. in Journ. Bomb. Nat. Hist.

Soc. xii. 352, t. 4. *D. orixensis*, Wt.; F. B. I. iii. 571, *not of* Willd.

W. Ghâts, evergreen forests of Travancore and Tinnevelly, about 2,000 ft.

A small tree reaching 30 ft. in height with white flowers and green fruit ·5–·75 in. in diam. The anthers are small and rounded. Bark black, mottled green and dark grey; wood hard, dull greyish-brown streaked with black, and with black patches. Vern. *Tam.* Vellei thuvarei; *Mal.* Meruvalan.

8. DIOSPYROS OOCARPA, Thw.; F. B. I. iii. 560.

Bababudan Hills of Mysore (Law); W. Ghâts, Anamalais and hills of Travancore up to 2,000 ft., in evergreen forests.

A small or moderate-sized tree with shining leaves, black when dry, very small flowers, and an ellipsoid oblong fruit, about 1 in. long, cylindric when young. Bark yellowish; wood greyish-brown with an irregular purplish-black streaked heartwood. Vern. *Mal.* Vellei karunkali.

9. DIOSPYROS BARBERI, Ramas. in Journ. As. Soc. Beng. x. 2 (1914), 47, tt. 3, 4.

Hills of Tinnevelly and Travancore, in evergreen forests, at 2,000–4,000 ft.

A small tree with ♂ flowers in short cymes, ♀ solitary with large leathery folded foliaceous calyx-lobes.

10. DIOSPYROS PRURIENS, Dalz.; F. B. I. iii. 553; Bedd. Ic. t. 129.

W. Ghâts, evergreen forests of S. Canara, Wynaad, Anamalais and hills of Tinnevelly, up to about 3,000 ft.

A small tree with softly hirsute branchlets, leaves and calyx, the fruit ovoid conical up to 1 in. long and clothed with fulvous stinging hairs.

11. DIOSPYROS FOLIOLOSA, Wall.; F. B. I. iii, 556. *D. calycina*, Bedd. Fl. t. 68, Ic. t. 123.

W. Ghâts, forests of Tinnevelly and S. Travancore, up to 3,000 ft.

A moderate-sized tree, conspicuous in fruit from the large foliaceous calyx-lobes, flowers bright yellow. Fruit yellow when dry, about 1 in. in diam., the seeds almost ruminate. Bark dark brown, smooth; wood yellowish-white, clouded with grey and black, hard. Vern. *Tam.* Vellei thuvarei.

12. DIOSPYROS PANICULATA, Dalz.; F. B. I. iii. 570; Bedd. Ic. t. 125.

W. Ghâts, evergreen forests of Malabar and Travancore, up to 3,000 ft.

A handsome tree of moderate size with greenish white ♂ flowers in pedunculate prominently bracteate cymes, the ♀ solitary recurved, the corolla tawny-villous; the fruit ovoid, green, 1 in. long. Bark black, rough; wood soft, white and grey in irregular patches with narrow stripes of black. Vern. *Tam.* Karun thuvarei; *Mal.* Kari, Karivella, Illakatta.

13. DIOSPYROS EBENUM, Koenig; F. B. I. iii. 558; Wt. Ic. t. 188; Bedd. Fl. t. 65.

Deccan and Carnatic, in dry evergreen forests, extending W. to N. Coimbatore and S. to Tinnevelly. Ebony.

A large or moderate-sized tree with greenish-yellow flowers and subglobose fruit ·75 in. in diam. seated on a woody cup. Bark dark grey, finely cracked longitudinally; wood very hard, sapwood grey, heartwood jet black, the ebony wood of India but very little utilised except for small articles and inlaying. A "Royal timber" in Travancore. Vern. *Tel.* Nalluti; *Tam.* Acha, Tumbi, Karun kali; *Kan.* Karemara.

14. DIOSPYROS ASSIMILIS, Bedd. in Madras For. Rep. 1866–7, p. 20, t. 1; F. B. I. iii. 558. *D. nigricans*, Dalz.; Bedd. Ic. t. 124.

N. Circars, Palkonda Hills of Vizagapatam (Gamble); W. Ghâts, S. Canara to Travancore, at 1,000–3,000 ft., in evergreen forests.

A large evergreen tree with pale yellow flowers and globose fruit. Bark black, thin, much cracked; wood hard, sapwood greyish-white, heartwood jet black streaked with grey and brown, much valued in Travancore and considered a "Royal timber" like that of *D. Ebenum* (Bourdillon). Vern. *Tam.* Karunthali; *Mal.* Karu, Mushtimbi.

15. DIOSPYROS NILAGIRICA, Bedd. Ic. t. 136; F. B. I. iii. 566.

W. Ghâts. W. slopes of Nilgiris, 3,000–4,500 ft. (Beddome), Anamalais and to the hills of Travancore, 3,000–5,000 ft., common about Peermerd.

A moderate-sized evergreen tree with yellowish-white 4-

merous flowers and smooth globose green fruit, 1 in. in diam. Bark black; wood brownish-yellow, moderately hard. Vern. *Tam.* Karu.

16. DIOSPYROS MONTANA, Roxb. Cor. Pl. t. 48; F. B. I. iii. 555; Wt. Ic. t. 1225.

N. Circars, Deccan and Carnatic in deciduous forest, westwards to the E. slopes of the Ghâts, at low levels. Common, but nowhere very abundant.

A small or moderate-sized, sometimes thorny, deciduous tree with greenish flowers and reddish-brown fruit. Bark thin, grey or greyish-black; wood grey tinged with yellow or brown, with darker patches, moderately hard, very little used. Vern. *Hind.* Tendu; *Ur.* Kosse kuli; *Tel.* Yerragoda.

17. DIOSPYROS CORDIFOLIA, Rox. Cor. Pl. t. 50; Wt. Ill. t. 148, *D. montana*, var. *cordifolia*, C. B. Clarke; F. B. I. iii, 555.

N. Circars, Deccan and Carnatic, westwards to the dry slopes of the Ghâts, and up to 2,000 ft., in dry deciduous or evergreen forests.

A small, thorny, branching deciduous tree with small white flowers and yellow fruit. Bark light greyish-brown; wood reddish or yellowish-white, moderately hard. Vern. *Tel.* Vackana.

18. DIOSPYROS CHLOROXYLON, Roxb. Cor. Pl. t. 49; F. B. I. iii. 560. *D. capitulata*, Wt. Ic. tt. 1224, 1588 *bis*.

N. Circars, Deccan and Carnatic, in dry evergreen forests, especially on laterite, common.

A large much-branched shrub, often thorny, in dry localities with small leaves, in better soils a small tree with larger leaves. Flowers, especially ♂, very small; fruit globose, ·2–·3 in. in diam., edible. Bark dark brown, peeling off in small scales; wood yellowish-grey, moderately hard, a good fuel. Vern. *Ur.* Kosai; *Tel.* Illinda, Nella ulimira.

19. DIOSPYROS MICROPHYLLA, Bedd. Ic t. 133; F. B. I. iii. 559.

W. Ghâts, evergreen forests of S. Canara, Malabar and Travancore, also of the Anamalais, up to 3,000 ft.

A large tree with black cylindric stem flecked with white, the young branches with long yellow hairs, the leaves small, the flowers minute, white, 4–5-merous. Wood

reddish-grey, hard and close-grained, apparently not used. Vern. *Tam.* Chinna thuvarei; *Mal.* Thovara kari.

20. DIOSPYROS OVALIFOLIA, Wt. Ic. t. 1227; F. B. I. iii. 557.

Deccan and Carnatic in most hilly regions in Nellore, Cuddapah, Kurnool, Trichinopoly, westwards to the drier slopes of the Ghâts and to S. Travancore, in dry forests at low levels.

A small evergreen tree with whitish flowers on the branchlets said to have a heartwood streaked with black. Vern. *Tam.* Vedukka nari.

21. DIOSPYROS PEREGRINA, Gürke in Engl. und Prantl. Naturl. Pflzm. iv. i. 164. *D. Embryopteris*, Pers.; F. B. I. iii. 556; Bedd. Fl. t. 69. *Embryopteris glutenifera*, Roxb. Cor. Pl. t. 70; Wt. Ic. tt. 843, 844.

N. Circars, in hill forests, chiefly along streams; W. Coast, on river banks and backwaters, extending into the valleys of the Ghâts; often cultivated.

A branching evergreen tree with large coriaceous leaves which are bright red when young, yellowish flowers and a large red velvety fruit with a viscid pulp used for paying the seams of boats. Bark dark grey, smooth; wood grey with darker streaks. Vern. *Hind.* Gâb; *Ur.* Gusva kendhu; *Tel.* Tumika; *Tam.* Tumbika; *Mal.* Paniccha.

Var. *atrata*, Thw. Buds and flowers covered with close black hairs. Leaves smaller. Evergreen forests of Travancore at about 4,000 ft. (Bourdillon).

22. DIOSPYROS SULCATA, Bourd. For. Trees Trav. 255.

W. Ghâts, evergreen forests of Travancore at low elevations (Bourdillon).

A small tree with large leaves and flowers in sessile clusters with many bracts; fruit truncate-conical, 1 in. broad, ·25 in. long, at first rusty-tomentose, deeply grooved with 8–10 grooves. Bark blackish-grey, smooth; wood brownish pink with occasional lines of black. Vern. *Mal.* Kari.

23. DIOSPYROS BOURDILLONI, Brandis Ind. Trees, 435, 713.

W. Ghâts, Anamalais and hills of Tinnevelly and Travancore, in evergreen forests up to 2,500 ft.

A large tree with a black rough fluted stem and thick drooping foliage; flowers white; fruiting calyx cup-like, with short pointed lobes. Bark black; wood yellowish-

grey with irregular rings of black and brown. Vern. *Tam.* Karun chatthi; *Mal.* Kari, Kodal, Therikka.

24. DIOSPYROS TOPOSIA, Buch.-Ham.; F. B. I. iii. 556; Bedd. Ic. t. 122 (poor!).

Evergreen forests of Tinnevelly and Travancore, up to 3,000 ft.

A large tree with large closely reticulate leaves, pale yellow 4-merous flowers and a large ovoid green pubescent fruit. Said, in Ceylon, to have a small black heartwood.

Diospyros philippensis, Gürke, *D. discolor*, Willd., is a tree with large oblong coriaceous leaves and large globose brown-hairy edible fruit, which is frequently met with in gardens. It is a native of the Philippine Islands.

Family XCVI. SYMPLOCACEAE.

Trees or shrubs. *Leaves* alternate, simple, sessile or shortly petioled; stipules 0. *Flowers* hermaphrodite, regular, axillary or terminal, solitary or in simple or compound spikes or racemes; bracts usually solitary at the base of each pedicel, bracteoles 1–3, both usually early caducous. *Calyx*-tube adnate to the ovary, lobes 5, imbricate. *Petals* 5 in 1 series or more in 2 series, usually free or shortly connate at the base, sometimes connate in a tube, imbricate. *Stamens* usually numerous, many-seriate, adnate to the corolla-tube or the petals, most usually in groups; filaments filiform or flattened; anthers short, dehiscing longitudinally. *Ovary* inferior, usually 3-, rarely 2- or 4-, celled; ovules 2–4 in each cell, pendulous from the inner angle; style filiform; stigma capitate or slightly lobed. *Fruit* a cylindric or subglobose drupe, crowned by the calyx-lobes; stone usually woody, 1–3-seeded. *Seeds* oblong, testa thin, albumen fleshy; embryo straight or curved, the cotyledons very short.

Symplocos, Linn.

CHARACTERS OF THE FAMILY.

Filaments more or less pentadelphous; corolla-tube divided nearly to the base:—

Stamens few, about 12, in pairs or 3–4 together or solitary, as long as the corolla; flowers in very short 3–6-flowered pubescent racemes; leaves elliptic, shortly acute at apex, cuneate at base, subcoriaceous,

entire or crenate-serrate, up to about 4 in. long, 1·25 in. broad, shortly petioled ..... 1. *oligandra.*

Stamens many, usually about 40, in several rows in a ring or in bundles at the base of the corolla :—

Drupe ampulliform, globose, ribbed, ·25 in. in diam., embryo curved ; flowers in axillary usually 3-branched spikes up to about 3 in. long ; leaves variable, coriaceous or chartaceous, elliptic or lanceolate, acute or acuminate, crenate or serrate, usually yellow when dry, the midrib impressed, up to 7 in. long, 2·5 broad 2. *spicata.*

Drupe ovoid-oblong, not ampulliform ; embryo straight :—

Midrib of leaf impressed on the upper surface :—

Inflorescence paniculate, the branches racemose ; leaves elliptic, caudate-acuminate, rounded at base, minutely serrulate, glabrous, about 5-nerved, up to 3·5 in. long, 1·5 in. broad. 3. *Candolleana.*

Inflorescence simple :—

Inflorescence 4–many-flowered :—

Drupe large, about 1 in. long or longer, smooth :—

Endocarp of drupe thick, crustaceous, stone with many shallow furrows ; leaves lanceolate or oblanceolate, long acuminate, closely serrate, yellowish when dry, up to 8 in. long, 2·5 in. broad, the main nerves regular, about 10 pairs ; branchlets and racemes rusty-pubescent ..... 4. *macrocarpa.*

Endocarp of drupe leathery, stone deeply 5–6 furrowed ; leaves elliptic-ovate, or -obovate, long acuminate, crenate-serrate, up to 5 in. long, 2 in. broad, green when dry, the main nerves 5–8 pairs ; branchlets glabrous 5. *kanarana.*

Drupe small, under 1 in. long, cylindric ovoid or oblong :—

Drupe villous, ·5 in. long ; branchlets, leaves beneath and inflorescence densely rusty-villous ; leaves coriaceous, elliptic, acuminate, crenulate, the margins recurved when old, up to 6 in. long, 3 in. broad, yellow when dry, the main nerves prominent, about 10–12 pairs ..... 6. *Gardneriana.*

Drupe glabrous :—

Leaves submembranous, bright green :—

Leaves cuneate at base :—

Racemes up to 2 in. long with very slender hispid rhachis and pedicels ; flowers large, calyx-lobes

rounded; leaves lanceolate, long-acuminate, up to 4 in. long, 1·5 in. broad, shortly and distantly serrate .....7. *acuminata.*

Racemes scarcely over 1 in. long with rather stout villous rhachis and short pedicels; flowers small, calyx-lobes acute; leaves lanceolate or oblanceolate, long- and sometimes abruptly-acuminate, up to 8 in. long, 2 in. broad, shortly but sharply serrate but sometimes nearly entire; drupe ovoid-oblong, ·5 in. long .....8. *rosea.*

Leaves rounded or cordate at base, oblong-oblanceolate, acute or acuminate at apex, up to 5 in. long, 1·5 in. broad, nearly quite entire; racemes very short and dense, prominently bracteate; calyx-lobes ovate, tawny villous; drupe oblong, ·6 in. long, contracted near the tip, the fruiting calyx lobes prominent 9. *Barberi.*

Leaves coriaceous:—

All parts quite glabrous; leaves obovate, obtuse, somewhat decurrent at base, entire or serrate when young, up to 3 in. long, 1·75 in. broad, main nerves about 6 pairs; spikes about 1.5 in. long with large flowers, the bracts ovate, caducous; drupe oblong, ·5 in. long .....10. *obtusa.*

Inflorescence fulvous-villous:—

Branchlets when young and leaf-midribs beneath hispid; leaves elliptic or oblong, acuminate, prominently serrate, up to 5 in. long, 1·5 in. broad but longer and broader when young; main nerves 8–12 pairs, reticulation conspicuous; spikes 1–1·5 in. long with large flowers, the bracts caducous; drupe cylindric, ·5 in. long ....11. *foliosa.*

Branchlets and leaves glabrous; leaves elliptic, acute or acuminate, crenate-serrate, shining above, the margin often recurved, up to 6 in. long, 2·5 in. broad, main nerves 6–10 pairs; spikes 2–5 in. long, the bracts ovate, caducous; drupe ovoid, ·4–·5 in. long .....12. *Beddomei.*

Inflorescence few- under 4-flowered:—

Leaves coriaceous, small:—

Flowers 1–4 in close pubescent spikes about ·5 in. long; leaves elliptic, ovate or obovate, obtuse or slightly

acute, minutely serrulate, the margin recurved, yellow when dry, up to 2·5 in. long, 1 in. broad, main nerves 5–6 pairs, prominent; drupe ovoid-oblong, ·5 in. long, the calyx teeth prominent .....13. *microphylla*.

Flowers solitary :—

Flower on a slender recurved peduncle up to ·5 in. long; leaves elliptic, obtuse or acute, serrulate, glabrous, up to 1·75 in. long, 1 in. broad, the main nerves 4–6 pairs, not prominent; drupe narrow, oblong, ·5–·75 in. long .....14. *anamallayana*.

Flower sessile or very shortly peduncled; leaves elliptic or lanceolate, acute or acuminate, entire or minutely toothed, up to 1·75 in. long, ·75 in. broad, main nerves not prominent .....15. *monantha*.

Leaves membranous, fairly large :—

Leaves oblong-lanceolate, long-acuminate, rounded or subcordate at base, brown hirsute on both surfaces and on the branchlets, sharply serrate, up to 6 in. long, 2 in. broad, main nerves oblique, 7–8 pairs; flowers large, about 3–4 in slender racemes .....16. *pulchra*.

Leaves lanceolate, long-acuminate, cuneate at base, pale brown-hirsute on the nerves and the branchlets, minutely serrate, up to 5 in. long, 1·5 in. broad, main nerves not oblique, 7–9 pairs; flowers solitary, small, subsessile, many-bracteate; drupe oblong, villous, up to ·5 in. long .....17. *villosa*.

Midrib of leaf raised on the upper surface, leaves elliptic, long-acuminate, cuneate at base, glabrous, shining, coriaceous, up to 5 in. long, 2 in. broad; branchlets angular; racemes ·5 in. long, few-flowered; drupe ovoid, glabrous, ·4 in. long, the calyx-lobes short .....18. *thefolia*.

Filaments adnate to the corolla-tube; corolla-tube elongate; flowers solitary :—

Flower peduncled, the peduncles 1–3 together, axillary or lateral, pendulous; calyx-lobes rounded, ciliate; corolla ·5 in. long, lobes spreading in flower; leaves elliptic-obovate, obtuse, coriaceous, glabrous, up to 4 in. long, 2 in. broad; drupe oblong, ·6 in. long, glabrous .....19. *pendula*.

Flower sessile or subsessile, erect, axillary; calyx-lobes very short, rounded, ciliate; corolla ·5 in. long, lobes suberect; leaves obovate, obtuse, coriaceous, glabrous, cuneate at base, up to 2 in. long, ·5–·75 in. broad; drupe oblong-obovoid, ·6 in. long, glabrous .....20. *sessilis*.

1. SYMPLOCOS OLIGANDRA, Bedd. Ic. t. 272; F. B. I. iii. 574.
   W. Ghâts, hills of Travancore and Tinnevelly, at 3,000–5,000 ft. (Beddome).
   A small or medium-sized tree, characterised by the few stamens.
2. SYMPLOCOS SPICATA, Roxb.; F. B. I. iii. 573, Var. *laurina*; Wt. Ill. t. 150.
   E. Ghâts, Hills of Vizagapatam, about 4,000 ft. (A. W. Lushington); Carnatic, Shevaroy Hills and Kollimalai Hills of Trichinopoly; W. Ghâts in all Districts, in evergreen Shola forests, above 3,000 ft.
   A small tree with white flowers. Bark thin, smooth, light grey; wood white, soft, even-grained, only used for fuel. Vern. *Hind.* Lodh; *Tam.* Kambli vetti; *Badaga* Boothgani.
3. SYMPLOCOS CANDOLLEANA, Brand Monog. 49.
   W. Ghâts, Anamalai Hills at 2,500 ft. (Beddome).
   A very large tree (Beddome), but very little known.
4. SYMPLOCOS MACROCARPA, Wight; F. B. I. iii. 582.
   W. Ghâts, evergreen forests of Travancore and Tinnevelly, at 2,000–3,000 ft.
   A much-branched, moderate-sized tree with white flowers and large white drupe. Bark smooth; wood white, soft. Vern *Tam.* Paralei; *Mal.* Malam parala.
5. SYMPLOCOS KANARANA, Talb. in Journ. Bomb. Nat. Hist. Soc. xi. 238, t. 9.
   W. Ghâts, Anamalais and hills of Travancore and Tinnevelly, in evergreen forests up to 2,000 ft.
   A moderate-sized tree with yellow drupe, the flowers not known.
6. SYMPLOCOS GARDNERIANA, Wt. Ic. t. 1231; F. B. I. iii. 582.
   W. Ghâts, Bababudan Hills of Mysore, at 6,000 ft. (Talbot), Nilgiris, Anamalais and hills of Tinnevelly and Travancore above 3,000 ft. in evergreen Shola forests.
   A tree with white flowers and purple (Bourdillon) fruit.

Var. ***Hohenackeri***, Gamble. *S. Hohenackeri*, C. B. Clarke; F. B. I. iii. 582. *S. Kurgensis*, C. B. Clarke; F. B. I. iii. 576 Calyx-tube glabrous.

W. Ghâts, Mercara in Coorg (Hohenacker).

7. SYMPLOCOS ACUMINATA, Bedd. Ic. t. 117; F. B. I. iii. 583. *S. tenella*, Brand Monog. 54.

W. Ghâts, from Wynaad to Travancore and Tinnevelly, at about 5,000 ft.

A graceful little tree with white flowers.

8. SYMPLOCOS ROSEA, Bedd.; F. B. I. iii. 583; Bedd. Ic. t. 115.

W. Ghâts, Anamalais and hills of Tinnevelly, at 2,000–4,000 ft., in evergreen forests.

A small tree or large shrub with tawny-villous branchlets, pink flowers and reddish drupe.

Var. *glabrior*, C. B. Clarke. Leaves rather thicker, more shining, less serrate, abruptly acuminate at apex; calyx-tube glabrous.

W. Ghâts, Wynaad and hills of Travancore at 1,000–3,000 ft., a shrub.

9. SYMPLOCOS BARBERI, Gamble in Kew Bull. 1921, 219.

W. Ghâts, hills of Tinnevelly (Beddome, Barber).

A small tree.

10. SYMPLOCOS OBTUSA, Wall.; F. B. I. iii. 583; Wt. Ic. t. 1233, Ill. t. 151 *b*.

W. Ghâts, Sholas of Nilgiris and Pulneys above 6,000 ft., most common at high elevations like Doddabetta.

A glabrous tree with white flowers and shining leaves yellowish when dry.

11. SYMPLOCOS FOLIOSA, Wt. Ic. t. 1234; F. B. I. iii. 582. *S. nervosa*, Wt. Ic. t. 1235 *not of* A. DC.

W. Ghâts, Sholas of Nilgiris and Pulneys above 5,000 ft., common; hills of Travancore (Bourdillon).

A moderate-sized or large tree with characteristic reticulate serrate leaves and white flowers. Wood white, soft and even grained, only used for fuel. Pulney specimens have longer and more acuminate leaves but do not differ otherwise. Young plants and shoots have the branchlets and leaves strigosely hairy and the serratures more marked. *Vern. Tam.* Pal velloday.

12. SYMPLOCOS BEDDOMEI, C. B. Clarke; F. B. I. iii. 582.

W. Ghâts, S. Canara, Malabar, Mysore and Coorg, at 2,000–4,000 ft.

A moderate-sized tree with white fragrant flowers and dark blue drupe turning yellow when dry.

13. SYMPLOCOS MICROPHYLLA, Wt. Ic. t. 1232; F. B. I. iii. 581.

W. Ghâts, Nilgiris about Avalanché and Sispara above 7,000 ft., in Shola woods.

A branching glabrous shrub about 6 ft. high.

14. SYMPLOCOS ANAMALLAYANA, Bedd. Ic. t. 116; F. B. I. iii. 581.

W. Ghâts, Anamalai Hills above 5,000 ft., in Shola woods (Beddome, Fischer).

A small tree.

15. SYMPLOCOS MONANTHA, Wt. Ic. t. 1236; F B. I. iii. 581.

W. Ghâts, Sivagiri and other hills of Tinnevelly.

A branching leafy shrub.

16. SYMPLOCOS PULCHRA, Wt. Ic. t. 1230, Spic-neilgh. t. 143; F. B. I. iii. 583.

W. Ghâts, Sispara in Nilgiris, at 4,000–5,000 ft., on stream banks.

A diffuse shrub with large white flowers and long tawny hairs to the leaves and branchlets.

17. SYMPLOCOS VILLOSA, Brand Monog. 63.

W. Ghâts, evergreen forests about Peermerd in Travancore at 3,000–4,000 ft.

A small much-branched tree with small white flowers.

18. SYMPLOCOS THEAEFOLIA, D. Don Prodr. Fl. Nep. 145; F. B. I. iii. 575.

N. Circars, Madgol Hills of Vizagapatam at Rangalu and Gomangi, 3,000–4,000 ft. (A. W. Lushington).

A small glabrous tree with bright shining leaves and very short inflorescence.

19. SYMPLOCOS PENDULA, Wt. Ic. t. 1237; F. B. I. iii. 587.

W. Ghâts, Anamalais, Pulneys and hills of Travancore, at 4,000–7,000 ft., in evergreen forests.

A small or moderate-sized tree with pink flowers, the drupes black when ripe.

20. SYMPLOCOS SESSILIS, C. B. Clarke; F. B. I. iii. 587.

W. Ghâts, hills of Travancore and Tinnevelly at 4,000–5,000 ft., in evergreen forests.

A small or moderate-sized tree with white or pinkish flowers and black drupe.

Family XCVII. OLEACEAE.

Trees or erect or climbing shrubs, unarmed. *Leaves* opposite, very rarely alternate, simple 3-foliolate or pinnate, entire or toothed; stipules 0. *Flowers* hermaphrodite, often dimorphous, sometimes polygamous or dioecious, regular, usually in trichotomous terminal or axillary cymes or panicles, rarely fascicled or racemose. *Calyx* small, free, campanulate, truncate or lobed. *Corolla* usually gamopetalous, lobes 4–9 or 0, imbricate or induplicate valvate; tube long or short. *Stamens* 2 (in Indian species), inserted on the corolla-tube, or, if petals free or 0, hypogynous; filaments usually short, anthers dehiscing laterally or subextrorsely. *Ovary* free, 2-celled; ovules 1–2 in each cell attached to the inner angle near the apex or base; style short or long; stigma simple or 2-lobed. *Fruit* a loculicidal capsule, or indehiscent, or a succulent berry or drupe. *Seeds* solitary or 2 in each cell, erect or pendulous; testa usually thin; albumen fleshy horny or 0; embryo straight; radicle inferior or superior.

Corolla-lobes imbricate :—

Seeds erect, radicle inferior :—

Shrubs, usually climbing; fruit of 2 berry-like carpels, one sometimes wanting ..... 1. **Jasminum.**

Erect shrub or small tree; fruit a compressed bipartite capsule ..... 2. **Nyctanthes.**

Seeds pendulous, winged, radicle superior; tree with a woody pyriform loculicidally dehiscent capsule ..... 3. **Schrebera.**

Corolla-lobes valvate :—

Erect trees or shrubs, leaves penninerved, radicle superior :—

Flowers in axillary panicles :—

Corolla of distinct petals, free or connate in pairs .. 4. **Linociera.**

Corolla tubular or 0 ..... 5. **Olea.**

Flowers in terminal panicles; corolla funnel-shaped .. 6. **Ligustrum.**

Scandent shrubs, leaves with prominent ribs; radicle inferior ..... 7. **Myxopyrum.**

1. Jasminum, Linn.

Erect or climbing shrubs. *Leaves* opposite, rarely alternate, simple trifoliolate or imparipinnate. *Flowers* usually handsome, often sweet-scented, in terminal or axillary cymes, rarely solitary; bracts linear and small or ovate, sometimes petaloid; bracteoles usually linear. *Calyx*-tube funnel-shaped or campanulate; lobes

4–9, usually linear. *Corolla*-tube narrow, more or less elongate; lobes 4–10, spreading, imbricate in bud. *Stamens* 2, usually included in the corolla-tube; anthers oblong, connective usually produced. *Ovary* 2-celled; ovules 2 in each cell, attached near the base; style filiform, long or short; stigma usually bifid. *Fruit* a didymous berry or simple by the suppression of one carpel; carpels globose ellipsoid or elongate. *Seed* in each carpel 1, rarely 2, erect; testa thin; albumen 0; cotyledons plano-convex; radicle inferior.

Leaves simple :—

Calyx pubescent :—

Calyx-lobes linear subulate :—

Calyx-lobes ·25 in. long or longer :—

Erect or somewhat climbing; calyx-lobes curled, especially in fruit; leaves variable, usually ovate, obtuse acute or even acuminate, membranous; carpels globose, black ..1. *Sambac.*

Climbing shrubs :—

Bracts ovate, green, often absent, calyx-lobes ·3–·5 in. long; corolla-lobes about 8, elliptic-oblong, acute; leaves ovate, acute, cordate at base, pubescent or tomentose, up to 2·5 in. long, 1·5 in. broad .....2. *pubescens.*

Bracts lanceolate, white; calyx-lobes ·2–·3 in. long; corolla lobes 5–7, oblong, obtuse; leaves elliptic-lanceolate, acuminate, rounded or cordate at base, villous or subglabrous, up to 4 in. long, 1·5–2 in. broad .....3. *Rottlerianum.*

Bracts subulate, filiform; calyx-lobes ·25 in. long; corolla lobes about 6, narrowly oblong, acute or acuminate; leaves broadly ovate, abruptly, rarely gradually, acuminate, truncate or rounded or slightly cordate at base, up to 5 in. long, 4 in. broad .....4. *malabaricum.*

Calyx-lobes under ·25 in. long; corolla-lobes oblong, acute :—

Suberect or climbing; cymes lax, trichotomous, the pedicels long, slender; calyx-lobes ·1 in. long, subclavate, erect; leaves broadly ovate, acute, truncate rounded or subcordate at base, usually nearly glabrous but sometimes tomentose, up to 4 in. long, 3 in. broad .....5. *arborescens.*

Climbing: cymes close, subcapitate, the pedicels very short or 0; calyx-lobes ·1–·15 in. long, recurved or curled; leaves ovate-lanceolate, acuminate, rounded or cordate at base, nearly glabrous, up to 4 in. long, 2 in. broad .....6. *scandens.*

Calyx-lobes very short, triangular, villous as are the lax cymes;

corolla-lobes acute; leaves elliptic-ovate or ovate, acute, rounded or attenuate at base, softly grey-tomentose on both sides, up to 5 in. long, 2·5 in. broad .....7. *Roxburghianum.*

Calyx glabrous or nearly so :—

Calyx-lobes linear, subulate :—

Calyx-lobes ·25 in. long or longer :—

Climbing shrubs :—

Cymes many-flowered, trichotomous; corolla-tube long, lobes oblong, acute; leaves large, ovate-lanceolate, long-acuminate, subcordate at base, glabrous, up to 6 in. long, 3 in. broad, prominently nerved especially from near the base .....8. *cordifolium.*

Cymes 1–3-, usually 1-flowered, subsessile; corolla-tube short, lobes linear; leaves small, ovate, acute, obtuse or rounded at base, nearly glabrous, up to 1·25 in. long, ·75 in. broad, the nerves obscure .....9. *sessiliflorum.*

Erect shrubs, sometimes subscandent; calyx-lobes up to ·35 in. long, sometimes under ·25 in., often minutely puberulous; cymes 1–3-flowered, the corolla-tube up to 1 in. long, lobes ·7 in., acute; leaves ovate, elliptic or lanceolate, acute, shining, coriaceous, nerves prominent .....10. *rigidum.*

Calyx-lobes less than ·25 in. long :—

Calyx-lobes about ·2 in. long, often ciliate; cymes lax, few-flowered, subpaniculate, pedicels slender, up to 1 in. long; corolla-tube slender, elongate, lobes very narrow; leaves membranous, ovate or elliptic, acuminate, cuneate at base, nearly glabrous, up to 4 in. long, 1·5 in. broad ....11. *Ritchiei.*

Calyx-lobes ·1–·2 in. long; cymes 1–3-flowered with slender pedicels ·5–·75 in. long; corolla-tube ·5–·75 in. long, lobes lanceolate, acuminate, ·5 in. long; leaves small, ovate, acute, rounded at base, glabrous, up to 1·5 in. long, ·75 in. broad 12. *angustifolium.*

Calyx-lobes ·1 in. long or less; cymes several flowered, trichotomous, the pedicels slender, about ·3 in. long; corolla-tube ·5 in. long, the lobes narrowly oblong, about as long; leaves narrowly lanceolate, long-acuminate, cuneate at base, up to 3·5 in. long, ·75 in. broad .....13. *Wightii.*

Calyx-lobes minute, triangular, sometimes almost none; cymes terminal, trichotomous, paniculate, the pedicels short and slender; corolla-tube ·2–·3 in. long, slender, lobes about the same, narrow, linear; leaves ovate-lanceolate, scarcely acute, often almost rounded at base, up to 2·5 in. long, 1 in. broad ..14. *trichotomum.*

eaves compound :—

Leaves trifoliolate :—

Leaves with the two lower leaflets very small and frequently wanting; calyx-lobes very small, ovate :—

Branchlets and leaves grey-pubescent ; cymes compound, many-flowered, trichotomous, paniculate, the pedicels slender and short ; corolla-tube ·5 in. long, lobes ·25 in. long, elliptic ; terminal leaflet ovate, obtusely acute, mucronate, rounded at base, up to 1·5 in. long, ·75–1 in. broad, the side leaflets when present scarcely ·3 in. long ..... 15. *auriculatum.*

Branchlets and leaves fulvous-tômentose ; cymes sessile, sub-capitate, few-flowered, the pedicels very short ; corolla-tube ·7–1 in. long, lobes ·3 in. long, elliptic ; terminal leaflet ovate, obtuse or acute, mucronate, cordate or rounded at base, up to 3 in. long, 1–1·5 in. broad, the side leaflets when present up to ·5 in. long ..... 16. *brevilobum.*

Leaves with all three leaflets similar and present, the lateral lobes little smaller than the terminal ; calyx-lobes minute :—

Leaves opposite, glabrous, leaflets elliptic or ovate, acute to caudate-acuminate at apex, rounded or obtuse or truncate at base, the terminal one up to 5 in. long, 2 in. broad ; cymes lax, elongate, paniculate ; corolla-tube ·7–1 in. long, lobes ·5 in., elliptic ; anthers apiculate ..... 17. *flexile.*

Leaves opposite or alternate, glabrous, leaflets broadly ovate or deltoid, obtuse or very shortly acute at apex, rounded or truncate at base, the terminal up to 2 in. long, 1·5 in. broad ; cymes trichotomous, the end branches corymbose ; corolla-tube ·75 in. long, ·3 in. broad, oblong ; anthers acute ..... 18. *calophyllum.*

Leaves imparipinnate :—

Leaves opposite ; corolla white, reddish beneath, lobes spreading, flowers in terminal corymbose panicles ; calyx-lobes long and linear 19. *grandiflorum.*

Leaves alternate ; corolla yellow, lobes recurved, flowers in short few-flowered cymes opposite the leaves ; calyx-lobes very short 20. *bignoniaceum.*

1. JASMINUM SAMBAC, Ait. ; F. B. I. iii. 591 ; Wt. Ic. t. 704.

All Districts, doubtfully really wild but common near villages as an escape from cultivation. Arabian Jasmine.

An erect or sometimes climbing small shrub with pubescent branchlets and fragrant white flowers. Cultivated plants have often double flowers, largely used for garlands. Vern. *Hind.* Mogra ; *Tam.* Kodi mulli.

Var. *Heyneanum*, C. B. Clarke, a twining form with small ovate acuminate leaves and shorter calyx-lobes. W. Ghâts, Pulney Hills, etc.

2. JASMINUM PUBESCENS, Willd.; F. B. I. iii. 592. *J. hirsutum*, Willd.; Wt. Ic. t. 702. *J. bracteatum*, Roxb.; Wt. Ic. t. 1248.
   W. Ghâts, in most Districts, up to 5,000 ft., but scarce, often cultivated.
   A climbing shrub with white flowers in dense capitate cymes and globose black carpels. Vern. *Hind.* Kundâ.
3. JASMINUM ROTTLERIANUM, Wall.; F. B. I. iii. 593; Wt. Ic. t. 1249.
   W. Ghâts, in all Districts, up to 5,000 ft.
   A large extensively climbing shrub, usually very tawny villous but sometimes nearly glabrous. Flowers and bracts white, the cymes close and terminal, the carpels ellipsoid, black.
4. JASMINUM MALABARICUM, Wt. Ic. t. 1250; F. B. I. iii. 594.
   W. Coast and W. Ghâts in S. Canara, Mysore, Malabar and W. Nilgiris up to about 4,000 ft.
   A large climbing shrub with white fragrant flowers in loose trichotomous terminal cymes, the carpels ellipsoid.

Var. *Lawii*, C. B. Clarke. Leaves gradually acuminate, calyx-lobes shorter and corolla-lobes narrower. Taliparamba in Malabar (Barber).

5. JASMINUM ARBORESCENS, Roxb.; F. B. I. iii. 594; Wt. Ic. t. 699. *J. latifolium*, Roxb.; Wt. Ic. t. 703.
   N. Circars, hills of Ganjam and Vizagapatam, up to 3,000 ft.
   A large suberect or climbing shrub with white fragrant flowers and black ellipsoid usually solitary carpels. The leaves are sometimes grey-tomentose on both surfaces.
6. JASMINUM SCANDENS, Vahl; F. B. I. iii. 595.
   N. Circars, hills of Ganjam and Vizagapatam, up to 4,500 ft. (Barber, A. W. Lushington).
   A climbing shrub with white flowers said to be sometimes tinged with pink, the carpels ellipsoid, usually solitary.
7. JASMINUM ROXBURGHIANUM, Wall.; F. B. I. iii. 595.
   Deccan, Ramandrúg Hills in Bellary, at 2,000 ft., Baba-budan hills of Mysore (Law).

A villous climbing shrub, the carpels usually solitary, black, ellipsoid.

8. JASMINUM CORDIFOLIUM, Wall.; F. B. I. iii. 596. *J. erectiflorum*, A. DC.; Wt. Ic. t. 1251.

W. Ghâts, Coimbatore and Nilgiris, up to 5,000 ft., hills of Tinnevelly.

A large climbing shrub with spirally twisted stems, white flowers and ellipsoid carpels.

9. JASMINUM SESSILIFLORUM, Vahl; F. B. I. iii. 597.

Carnatic, from Chingleput and S. Arcot to the E. slopes of the W. Ghâts, southwards to the Tinnevelly Hills.

A branching climber with small leaves, white flowers and globose carpels.

10. JASMINUM RIGIDUM, Zenk. Pl. Ind. Coimb. t. 6; F. B. I. iii. 598; Wt. Ic. t. 1247.

Deccan and Carnatic, in plains and hills, up to 5,000 ft., westwards to the E. slopes of the W. Ghâts, common.

A rigid shrub with shining leaves, white flowers and black subglobose carpels. Vern. *Tel.* Uti, Pedda malli.

11. JASMINUM RITCHIEI, C. B. Clarke; F. B. I. iii. 598.

W. Ghâts, hills of Mysore, Nilgiris, Wynaad, in evergreen forests at low levels; Shevaroy Hills.

A branched climbing shrub with slender white flowers and globose carpels.

12. JASMINUM ANGUSTIFOLIUM, Vahl; F. B. I. iii. 598; Wt. Ic. t. 698.

Circars, Deccan and Carnatic, on eastern side, down to S. Travancore.

A wiry climbing shrub with white flowers and ellipsoid carpels.

13. JASMINUM WIGHTII, C. B. Clarke; F. B. I. iii. 598.

Bolampatti Valley of Coimbatore (Wight).

A wiry climber with very flexuous branches.

14. JASMINUM TRICHOTOMUM, Heyne; F. B. I. iii. 599.

W. Deccan, Coimbatore Hills, up to 2,000 ft.; Carnatic, in Tanjore; Paulghatcheri (Cleghorn).

A rather stiff climbing shrub.

15. JASMINUM AURICULATUM, Vahl; F. B. I. iii. 600; Wt. Ic. t. 700. *J. affine*, Wt. Ic. t. 1255. *J. ovalifolium*, Wt. Ic. t. 1296.

Circars, Deccan and Carnatic, in all Districts, south to S. Travancore, westwards to the dry slopes of the W. Ghâts, sometimes cultivated.

A climbing shrub with white flowers and globose black carpels.

16. JASMINUM BREVILOBUM, A. DC.; F. B. I. iii. 600.

W. Ghâts, Nilgiris and Pulneys above 3,000 ft., in Shola forest.

A large climbing shrub with spirally twisted stems up to 1 ft. in diameter and a curious wood-structure. Flowers white, carpels black, globose.

17. JASMINUM FLEXILE, Vahl; F. B. I. iii. 601; Wt. Ic. t. 1253.

W. Coast and W. Ghâts, in all Districts, up to 5,000 ft.

A climbing shrub with white fragrant flowers and ellipsoid carpels.

Var. *travancorense*, Gamble. *J. travancorense*, Klein, in Wall. Cat. 2881, the terminal leaflet shining, not truncate at base, elliptic-oblong, the nerves, about 8 pairs, more prominent and prominently arched, the apex caudate.

W. Coast, S. Canara to Travancore at low elevations.

18. JASMINUM CALOPHYLLUM, Wall.; F. B. I. iii. 602. *J. courtallense*, Wt. Ic. t. 1252.

W. Ghâts, Nilgiris, Anamalais and hills of Tinnevelly, up to 4,000 ft.

A slender climber with white flowers and subglobose carpels.

19. JASMINUM GRANDIFLORUM, Linn.; F. B. I. iii. 603; Wt. Ic. t. 1257.

N. Circars, Mahendragiri in Ganjam (Fischer), hills of Vizagapatam (A. W. Lushington); W. Ghâts, Nilgiris. Pulneys and hills of Tinnevelly above 5,000 ft., probably introduced and run wild, often cultivated.

A climbing shrub with fragrant flowers. Vern. *Hind.* Chambel.

20. JASMINUM BIGNONIACEUM, Wall.; Fyson Hillt. Fl. 276, *J. humile*, Linn.; F. B. I. iii. 602 *in part*. *J. revolutum*, Sims, var. *peninsulare*, A. DC.; Wt. Ic. t. 1258.

W. Ghâts, Nilgiris, Pulneys and hills of Malabar and Travancore, above 5,000 ft.

An erect shrub with angular branchlets, small leaflets, few rather large bright yellow flowers and black globose carpels.

2. Nyctanthes, Linn.

Shrubs or small trees. *Leaves* opposite, ovate, entire or toothed. *Flowers* in small sessile bracteate heads disposed in terminal trichotomous cymes. *Calyx* ovoid-cylindric, sub-truncate, finally splitting or deciduous. *Corolla* salver-shaped; tube cylindric, orange; lobes 4–8, contorted in bud, spreading, white. *Stamens* 2, subsessile near the top of the corolla-tube. *Ovary* 2-celled; ovule 1 in each cell, erect, basal; style cylindric; stigma shortly bifid. *Fruit* an orbicular capsule, compressed parallel to the septum, separating when ripe into 2 1-seeded cells. *Seed* erect, flattened, testa thin; albumen 0; cotyledons flat; radicle inferior.

NYCTANTHES ARBOR-TRISTIS, Linn.; F. B. I. iii. 603; Bedd. Fl. t. 240.

N. Circars, in deciduous forests down to the Godavari, elsewhere doubtfully wild but commonly cultivated.

A bushy shrub or small tree rough with stiff hairs. The yellow corolla-tubes give an orange dye and the flowers, which come out in the evening and fall off in the morning, are used in garlands, while the rough leaves may be used for polishing wood. Bark rough, light brown; wood pale red or yellowish-brown, close-grained. Vern. *Hind.* Harsinghar; *Ur.* Godokodika; *Tel.* Poghada; *Tam.* Manjhapu.

3. Schrebera, Roxb.

Trees. *Leaves* opposite, imparipinnate, leaflets opposite. *Flowers* in terminal 2–3-chotomous compound cymes; bracts small. *Calyx* campanulate, truncate or unequally 4–7-toothed. *Corolla* salver-shaped; tube cylindric; lobes 4–7, imbricate in bud, then spreading. *Stamens* 2, near the top of the corolla-tube; filaments short. *Ovary* 2-celled; ovules 3–4 in each cell, pendulous from its apex; style cylindric; stigma shortly bifid. *Fruit* a woody obovoid, loculicidally 2-valved capsule. *Seeds* pendulous; testa winged; albumen 0; cotyledons fleshy, flattened, with wavy longitudinal plaits; radicle superior.

SCHREBERA SWIETENIOIDES, Roxb.; Cor. Pl. t. 101; F. B. I. iii. 604; Wt. Ill. t. 162; Bedd. Fl. t. 248.

N. Circars and Deccan, in deciduous forest, especially in Ganjam, Godavari and Kurnool; Forest of Mudumalai in S.E. Wynaad.

A moderate-sized tree reaching about 50 ft. in height, the flower yellowish-brown covered with brown glands, the capsule about 2 in. long, the leaflets 7–9, glabrous or villous beneath. Bark grey, thick; wood brownish-grey, hard and close-grained, resembling boxwood in texture. Vern. *Hind.* Moka; *Ur.* Jantia, Nemiburo; *Tel.* Makkam; *Tam.* Mogalinga.

4. Linociera, Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* in axillary or lateral rarely terminal panicles or cymes; bracts small. *Calyx* small, 4-lobed. *Corolla* of 4 long or short petals, nearly free or connate in pairs, induplicate-valvate in bud. *Stamens* 2; filaments short, attached at the base of the petals; anthers dehiscing on the margin, connective broad. *Ovary* 2-celled; ovules 2 in each cell, pendulous from its apex; style short; stigma bifid or entire. *Fruit* a globose ellipsoid or oblong drupe; exocarp thin, endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albumen fleshy or 0, if fleshy the cotyledons flattened, radicle superior.

Seeds albuminous; flowers in clusters in few-branched cymes, the corolla-lobes ·25 in. long; drupe ellipsoid :—

Calyx-lobes ovate, grey-pubescent; leaves elliptic or elliptic-oblong, obtuse or with a short abrupt acumen, cuneate at base, up to 5 in. long, 2 in. broad, main nerves about 10 pairs joining in loops; ovary pubescent ..... 1. *malabarica.*

Calyx-lobes rounded, nearly glabrous but ciliate; leaves elliptic, caudate-acuminate at apex, somewhat rounded at base, up to 4 in. long, 1·75 in. broad, main nerves about 8 pairs joining in loops at about ·1 in. from the margin; ovary glabrous ..... 2. *Wightii.*

Seeds exalbuminous; flowers in panicles, the corolla-lobes less than ·25 in. long :—

Panicles short, 1–1·25 in. long; calyx-lobes small, ciliate; corolla-lobes ·15 in. long; leaves obovate, obtusely acute or emarginate, cuneate at base, margins recurved, up to 3 in. long, 1·5 in. broad; ovary glabrous ..... 3. *zeylanica.*

Panicles more than 1·25 in. long :—

Drupe ellipsoid, ·3–·6 in. long; panicles up to 5 in. long; corolla-lobes ·1–·15 in. long; leaves elliptic or elliptic-oblong or -lanceolate, acuminate at both ends, shining, up to 7 in. long, 2·5 in. broad, more in young plants or shoots, main nerves prominent, regular, about 10–12 pairs, ·3–·5 in. apart on the midrib ..... 4. *intermedia.*

Drupe oblong, ·6–·8 in. long; panicles about 3–4 in. long; corolla-lobes ·1 in. long; leaves oblong or elliptic-oblong or slightly oblanceolate, shortly acute at apex, acuminate at base, rather dull, up to 8 in. long, 2·5 in. broad, main nerves about 8 pairs, ·6–1 in. apart on the midrib ..... 5. *macrophylla.*

Seeds not known; flowers in short axillary racemes or clusters, about ·5 in. long, glabrous; leaves elliptic-oblong, thick, drying red-brown, shortly abruptly acuminate at apex, up to 7·5 in long, 2·5 in. broad, the main nerves about 10 distant pairs, prominent and prominently joining in loops ..... 6. *courtallensis.*

1. LINOCIERA MALABARICA, Wall.; F. B. I. iii. 607; Wt. Ic. t. 1246. *Chionanthus malabarica*, Bedd. Fl. t. 239, *fig. in corner.*

   N. Circars, Palkonda hills of Vizagapatam, at 2,000 ft. (Gamble); Carnatic, Melpat and Javadis in S. Arcot (Barber, Fischer); W. Ghâts, in all Districts, in evergreen forests up to 4,000 ft.

   A small or moderate-sized tree with white or yellowish-white flowers.

2. LINOCIERA WIGHTII, C. B. Clarke; F. B. I. iii. 608. *Olea linocieroides*, Wt. Ic. t. 1241.

   W. Ghâts, hills of Travancore and Tinnevelly, in evergreen forest, at low levels.

   A small tree with white flowers.

3. LINOCIERA ZEYLANICA, Gamble n. comb. *L. purpurea*, Vahl; F. B. I. iii. 608.

   Deccan and Carnatic, Ballipalle forests of Cuddapah at 1,000 ft., Nellore forests, Kambakam hills of Chingleput; W. Ghâts, hills of S. Tinnevelly and Travancore at 1,000–2,000 ft.

   A small tree with red (?) flowers. Wood white or yellowish-white, hard and close-grained like boxwood. Vern. *Tel.* Punisi, Panagam.

4. LINOCIERA INTERMEDIA, Wt. Ic. t. 1245; F. B. I. iii. 609. *Chionanthus intermedia*, Bedd. Fl. t. 239 (*leaves bad*).

   N. Circars, hill forest, up to 4,500 ft. on Mahendragiri, etc., south to the Godavari, west to Jeypore; Carnatic, Shevaroy Hills, Kollimalai hills of Trichinopoly; W. Ghâts, from Mysore and Coimbatore southwards, up to 5,000 ft., on E. side.

A large tree with white flowers. Bark light yellowish-brown; wood white, moderately hard, close-grained.

5. LINOCIERA MACROPHYLLA, Wall.; F. B. I. iii. 610.
N. Circars, Ganjam to Godavari, in forest, especially about Surada at 1,500 ft.: Pulney Hills (Bourne)?; hills of Travancore at 4,000 ft. in moist forest (Bourdillon).
A tree with white flowers and oblong drupes, the leaves distinct by the distant nerves. The Travancore specimens have smaller leaves than those from the north, but seem otherwise to belong to the same species.

6. LINOCIERA COURTALLENSIS, Bourd. Trav. Trees 260. *L. leprocarpa*, Thw. var. *courtallensis*, C. B. Clarke: F. B. I. iii. 609. *Chionanthus courtallensis*, Bedd.
W. Ghâts, about Courtallum in Tinnevelly; Peermerd and Cardamom Hills of Travancore at 3,000–5,000 ft. in evergreen forests.
A medium-sized tree with white flowers and a brownish-purple ovoid drupe 1 in. long (Bourdillon).

5. Olea, Linn.

Shrubs or trees. *Leaves* opposite, entire or toothed. *Flowers* small, hermaphrodite dioecious or polygamous, in axillary or lateral rarely terminal panicles: bracts small. *Calyx* small, 4-lobed. *Corolla* rotate or campanulate; lobes 4, valvate, often induplicate. *Stamens* 2, on the corolla-tube or subhypogynous; filaments short, connective broad, anthers dehiscing marginally. *Ovary* 2-celled; ovules 2 in each cell; style short; stigma capitate or bifid. *Fruit* an ellipsoid or subglobose drupe; exocarp fleshy, endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albumen fleshy; cotyledons flat; radicle superior.

Flowers hermaphrodite; corolla deeply lobed, the lobes spreading, flattened; leaves rhomboid lanceolate elliptic or ovate, acuminate, usually very abruptly, at apex, cuneate at base, glandular in the nerve-axils, chartaceous, up to 4 in. long, 2 in. broad .....1. *glandulifera.*
Flowers polygamo-dioecious; corolla campanulate, the lobes short, their margins induplicate-valvate; leaves coriaceous:—
Leaves variable in shape, usually elliptic-lanceolate, entire or serrate, acute or acuminate, acute at base, up to 5 in. long, 2 in. broad, the main nerves 8–12 pairs .....2. *dioica.*

Leaves broadly elliptic, suddenly shortly acuminate, entire, drying reddish-brown, the margins recurved, up to 3·5 in. long, 1·5 in. broad 3. *polygama*.

1. OLEA GLANDULIFERA, Wall.; F. B. I. iii. 612; Wt. Ic. t. 1238; Bedd. Fl. t. 238. *O. Bournei*, Fyson in Kew Bull. 1914, 186.

   N. Circars, hills of Ganjam and Vizagapatam, up to 4,500 ft. on Mahendragiri; Deccan, Bababudan Hills of Mysore at 5,000 ft.; W. Ghâts in almost all districts, in Shola forests above 4,000 ft.

   A moderate-sized tree with white flowers and an ovoid drupe. The South Indian trees (*O. Bournei*) have more rounded leaves with fewer main nerves than those of N. India, but otherwise seem to be the same. Bark grey; wood reddish-grey, hard. Vern. *Badaga*, Kunthay.

2. OLEA DIOICA, Roxb.; F. B. I. iii. 612; Wt. Ill. t. 151.

   W. Ghâts, all Districts, up to about 5,000 ft., both in deciduous and evergreen forest.

   A moderate-sized or large tree with creamy white flowers, variable leaves and an ovoid blue drupe. Bark brown, rough; wood pale brown, hard. Vern. *Tam.* Koli, Payar, Yedalei; *mal.* Edana.

3. OLEA POLYGAMA, Wt. Ic. tt. 1239, 1240; F. B. I. iii. 613.

   W. Ghâts, between Avalanché and Sispara, Nilgiris, about 7,000 ft., in Shola forest.

   A small tree with many pretty white flowers, the drupe unknown.

6. Ligustrum, Linn.

Shrubs or trees; branchlets often lenticellate. *Leaves* opposite, entire. *Flowers* white, in terminal often thyrsoid panicles, the lower nodes often bracteate. *Calyx* small, truncate or shortly 4-toothed. *Corolla* funnel-shaped, the tube short or long; lobes 4, induplicate-valvate. *Stamens* 2, on the corolla-tube; anthers oblong or rounded, included or exserted. *Ovary* 2-celled, ovules 2 in each cell, pendulous; style rather long; stigma subclavate. *Fruit* a 1-3-seeded drupe, endocarp chartaceous or thin. *Seeds* pendulous; testa thin; albumen fleshy; radicle short, superior.

Panicles loose, puberulous, up to 12 in. long with rather short slender distant bracteate branches; leaves elliptic or lanceolate, long and sharply

acuminate, up to 4 in. long, 2 in. broad; drupes obovoid, up to ·25 in. long; flowers small, corolla-tube about as long as the calyx 1. *Walkeri.*
Panicles large, pubescent, often 8 in. long and broad with stout thick branches; leaves ovate-lanceolate, acuminate, up to 5 in. long, 2 in. broad; drupe oblong, often curved, up to ·5 in. long; flowers rather small, corolla-tube as long as the calyx ..... 2. *Roxburghii.*
Panicles short, broad, depressed above, up to 2·5 in. long, 4 in. broad, glabrous; leaves lanceolate, acuminate at both ends, long-petioled, up to 3 in. long, 1 in. broad; drupe ellipsoid, ·4 in. long; flowers small, corolla-tube as long as the calyx ..... 3. *travancoricum.*
Panicles stout, short, dense, glabrous or nearly so, scarcely 3 in. long; leaves ovate or elliptic, acute, up to 2 in. long, ·75 in. broad; drupe ellipsoid, ·25 in. long; flowers rather large, corolla-tube twice as long as the calyx ..... 4. *Perrottetii.*
Panicles lax, short, glabrous, scarcely 1·5–2 in. long; leaves elliptic-lanceolate, acute or acuminate, up to 2·5 in. long, ·75 in. broad; drupe ellipsoid, ·25 in. long; flowers very small, corolla-tube scarcely as long as the calyx ..... 5. *Decaisnei.*

1. LIGUSTRUM WALKERI, Dcne; F. B. I. iii. 614.
W. Ghâts in most Districts, up to 5,000 ft.; Shevaroy Hills and Kollimalai Hills (?).
A small tree with large bracteate panicles, large leaves and lenticellate branchlets.
2. LIGUSTRUM ROXBURGHII, C. B. Clarke; F. B. I. iii. 615. *Olea robusta*, Wt. Ic. t. 1242.
W. Ghâts, Nilgiris, Pulneys and hills of Coimbatore, at 4,000–6,000 ft. in Shola forest, especially about Coonoor and on other E. slopes.
A small or medium-sized tree with broad panicles, rather large leaves and lenticellate branchlets. Wood white, close-grained.
3. LIGUSTRUM TRAVANCORICUM, Gamble in Kew Bull., 1922, 119.
W. Ghâts, hills of Travancore and Tinnevelly, at about 4,500 ft. (Bourdillon).
A small tree with depressed panicles and long-acuminate, long-petioled coriaceous leaves.
4. LIGUSTRUM PERROTTETII, A. DC.; F. B. I. iii. 615; Wt. Ic. t. 1244. *L. neilgherrense*, Wt. Ic. t. 1243; F. B. I. iii. 615.
W. Ghâts, Nilgiri Hills, on the banks of streams at 6,000–

7,000 ft., common, Pulneys, Anamalais and hills of Tinnevelly, more scarce.

A large shrub resembling the European Privet (*L. vulgare*, Linn.) but with larger flowers.

Var. *obovatum*, Gamble. *L. neilgherrense*, Wt. var. *obovata*, C. B. Clarke; F. B. I. iii. 615. Leaves obovate, obtuse, panicles larger.

Bababudan hills of Mysore (Law).

5. LIGUSTRUM DECAISNEI, C. B. Clarke; F. B. I. iii. 616.

W. Ghâts, hills of Coimbatore, Nilgiris, hills of Madura and Tinnevelly, on Eastern slopes usually, up to 5,000 ft.

A shrub with rough branchlets, small leaves and flowers.

Var. *microphylla*, C. B. Clarke. *L. microphyllum*, Wt.; leaves lanceolate, narrow, acuminate; panicles rather longer.

W. Ghâts, Sivagiri and Courtallum Hills of Tinnevelly.

Var. *Beddomei*, Gamble. *L. microphyllum*, Bedd. Fl. Sylv. cliv; leaves very small, under 1 in. long, ovate, acute; panicles slender, with distant branches.

Coorg, about Kiggatnad (Beddome).

Ligustrum lucidum, Ait., is a Chinese species frequently found in gardens in the Hills.

7. Myxopyrum, Blume.

Large scandent shrubs; branches 4-angular. *Leaves* opposite, triplicostate, entire or serrulate. *Flowers* small, yellowish, in axillary or terminal trichotomous panicles; bracts minute or 0. *Calyx*-tube short; lobes 4. *Corolla*-tube urceolate; lobes 4, induplicate-valvate in bud. *Stamens* 2, on the base of the corolla-tube; filaments short; anthers ovate. *Ovary* 2-celled, ovules 1–2 in each cell; style very short; stigma 2-lobed. *Fruit* a 1–2-seeded subglobose berry; pericarp crustaceous. *Seeds* erect, testa membranous; albumen thick; cotyledons flat, ovate; radicle inferior.

MYXOPYRUM SERRATULUM, A. W. Hill in Kew Bull. 1910, 41. *M. smilacifolium*, Bl.; F. B. I. iii. 618 *in part*.

W. Ghâts, Wynaad, Anamalai Hills and hills of Travancore, in evergreen forests, at 2,000–3,000 ft.

A large climbing shrub with serrulate lanceolate acuminate leaves which have prominent side ribs forming a looped nerve to which the few main nerves are joined.

Family XCVIII. SALVADORACEAE.

Shrubs or trees, unarmed or spiny. *Leaves* opposite, entire; stipules minute or 0. *Flowers* small, hermaphrodite or diœcious, in panicled spikes or racemes. *Calyx* free, campanulate or ovoid, 3–5-lobed. *Corolla* shortly campanulate or the petals free; lobes 4, imbricate in blood. *Stamens* 4, on the corolla-tube or hypogynous, alternate with the corolla-lobes; anthers ovate. *Ovary* superior, 1–2-celled; ovules 1–2 in each cell; style short; stigma 2-fid or subentire. *Fruit* a berry or drupe, usually 1-seeded. *Seed* erect, globose; albumen 0; cotyledons fleshy, plano-convex.

Erect unarmed trees or shrubs; corolla gamopetalous; stamens on the corolla-tube; ovary 1-celled, 1-ovuled ..... 1. **Salvadora.**
Rambling shrubs with axillary spines; corolla of free petals; stamens free; ovary 2-, or falsely 4-celled, ovules 1–2 ..... 2. **Azima.**

1. Salvadora, Linn.

Shrubs or trees. *Leaves* opposite, entire *Flowers* small, sessile or pedicelled, in panicled spikes or racemes; bracts minute. *Calyx* campanulate, 4-lobed. *Corolla* campanulate, tube short, lobes 4. *Stamens* 4, inserted at the base or middle of the corolla-tube. *Disk* of 4 small scales or glands or 0. *Ovary* 1-celled; ovule solitary; style very short or 0; stigma truncate. *Drupe* globose, supported by the persistent calyx and corolla; endocarp crustaceous. *Seed* erect, globose.

SALVADORA PERSICA, Linn.; F. B. I. iii. 619; Roxb. Cor. Pl. t. 26. *S. indica*, Wt. Ill. t. 181. *S. Wightiana*, Bedd. Fl. t. 247.

Circars, Deccan and Carnatic, in open places, especially on saline lands and often on black cotton soil. Tooth-brush tree.

A large evergreen shrub or small tree with short trunk, very small flowers and fruit and rather small ovate-oblong obtuse petioled greyish-green leaves. Bark thin, grey; wood white, soft. The twigs are used as tooth-cleaners. Vern. *Hind.* Jhal; *Tel.* Waragu-wenki, *Tam.* Opa.

2. Azima, Lamk.

Rambling shrubs with axillary spines. *Leaves* opposite, entire. *Flowers* diœcious, small, axillary, sessile or clustered on the

branches of a slightly branched panicle; bracts 0 or foliaceous; bracteoles linear. *Calyx* campanulate, in ♂ 4-fid, in ♀ irregularly 2–4-lobed. *Corolla* of 4 free narrow imbricate petals. *Stamens* 4; filaments slender. *Ovary* 2-celled; ovules 1 or 2 in each cell, erect; stigma subsessile, large. *Fruit* a globose usually 1 seeded berry; endocarp membranous. *Seeds* 1-2, globose.

AZIMA TETRACANTHA, Lamk.; F. B. I. iii. 620; Wt. Ill. t. 152. Circars, Deccan and Carnatic, especially near the coast, in hedges and thickets.

A straggling shrub with pale almost quadrangular branchlets, greyish-green shining leaves with 2–3 pairs of prominent nerves from the base, mucronate tips and straight spines from the axils. The white berries are eaten. Vern. *Tel.* Tella upi; *Tam.* Ichanka.

Family XCIX. APOCYNACEAE.

Trees or erect or climbing shrubs, rarely herbs. *Leaves* opposite or whorled, rarely alternate, entire; stipules 0. *Flowers* regular, hermaphrodite, in terminal or axillary cymes, often large and showy; bracts small. *Calyx* inferior; lobes 5, imbricate; often with glands within at the base. *Corolla* usually salver-shaped or funnel-shaped; lobes 5, rarely 4, contorted and often twisted in bud, overlapping to right or left. *Stamens* 5, rarely 4, alternate with the corolla-lobes, inserted in the corolla-tube or on its mouth; filaments usually short; anthers linear-oblong or sagittate, free or connivent in a cone and adherent to the stigma by the connective, anther cells dehiscing longitudinally, sometimes produced at the base in empty spurs. *Disk* 0 or annular or cupular or reduced to 2–5 scales or glands. *Ovary* 1-celled with 2 parietal placentas or 2-celled with axile placentas, or of 2 distinct or partially connate carpels; ovules 2 or few or many, rarely solitary; style simple or divided at the base; stigma usually ending in an entire or bifid apiculus. *Fruit* a dry or fleshy drupe berry or samara, or of 2 baccate or follicular mericarps. *Seeds* various, often compressed, sometimes winged, sometimes with a tuft of hairs (*coma*) at one or both ends; albumen hard, fleshy, or scanty or 0; embryo straight; cotyledons flat, concave convolute or contracted; radicle superior.

Anthers included, free from the stigma, the cells rounded at the base :—
Ovary of 2 wholly combined carpels, 1–2-celled; seeds without **wing** or **coma** :—
Ovary 1-celled; fruit 2-valved :—
Flowers small; fruit a fleshy berry .....1. **Chilocarpus.**
Flowers large and showy; fruit a spinescent capsule **Allamanda.**
Ovary 2-celled; erect or climbing spinose shrubs .....2. **Carissa.**
Ovary of 2 distinct carpels, usually united by the style but sometimes **at the base** or throughout :—
Leaves alternate; corolla large and showy, the lobes overlapping **to left** :—
Corolla funnel-shaped; fruit indehiscent :—
Calyx glandular within; flowers yellow; leaves linear **Thevetia.**
Calyx not glandular within; flowers white; leaves oblanceolate, fleshy .....3. **Cerbera.**
Corolla salver-shaped; fruit of 2 dehiscent follicles; calyx not glandular within; flowers yellowish-white or -red ....**Plumeria.**
Leaves opposite or whorled; corolla salver-shaped :—
Calyx not glandular within· fruit of 2 1- or many-seeded **drupes** or follicles :—
Fruit indehiscent, drupaceous; seeds few, without wings or **coma** :—
Corolla-lobes overlapping to the left :—
Leaves usually whorled; erect shrubs; fruit mericarps more or less united, sessile .....4. **Rauwolfia.**
Leaves opposite; trees; fruit mericarps stalked 5. **Hunteria.**
Corolla-lobes overlapping to the right; trees or shrubs with opposite leaves; fruit mericarps 1–2-seeded, free ..**Kopsia.**
Fruit dehiscent, of 2 slender many-seeded follicles, corolla-lobes overlapping to the left :—
Herbaceous plants with opposite leaves; seeds truncate at both ends .....6. **Lochnera.**
Trees or shrubs with whorled leaves; seeds ciliate at both ends .....7. **Alstonia.**
Calyx glandular within, fruit of 2 follicular mericarps :—
Follicles many-seeded, linear :—
Corolla-lobes overlapping to the left; seeds winged at both ends; climbing shrubs .....8. **Ellertonia.**
Corolla-lobes overlapping to the right; seeds with a deciduous silky coma at the top; trees .....9. **Holarrhena.**

Follicles few-seeded, baccate, stout and coriaceous; seeds arillate, without coma; erect trees or shrubs :—

Corolla-tube dilated at the base, lobes overlapping to the left; leaves with conspicuous horizontal impressed main nerves ..... 10. **Rejoua.**

Corolla-tube slightly dilated near the top, lobes overlapping to the left or right; leaves with slender oblique main nerves 11. **Ervatamia.**

Anthers included or exserted, conniving in a cone round and adherent to the stigma, the cells produced at base in an empty spur; fruit of 2 follicular mericarps with comose seeds :—

Anthers exserted :—

Climbing shrubs; coma of the seeds terminal :—

Filaments of the stamens long, spirally twisted .... 12. **Parsonsia.**

Filaments of the stamens short, not spirally twisted 13. **Vallaris.**

Erect trees or shrubs; coma of the seeds basal; corolla with a corona of scales ..... 14. **Wrightia.**

Anthers included :—

Mouth of corolla with a ring of scales :—

Erect shrubs with whorled leaves and pink flowers; corolla lobes not tailed ..... **Nerium.**

Spreading or climbing shrubs with opposite leaves; corolla-lobes tailed ..... 15. **Strophanthus.**

Mouth of corolla naked; leaves opposite; climbing shrubs :—

Corolla very large, white; leaves very large :—

Corolla campanulate or funnel-shaped..... 16. **Beaumontia.**

Corolla salver-shaped, lobes sharply twisted to the left 17. **Chonemorpha.**

Corolla medium-sized, tube bearded within behind the anthers; calyx divided nearly to the base..... 18. **Aganosma.**

Corolla small, the lobes overlapping to the right :—

Follicles stout, large, the seeds long-beaked.... 19. **Anodendron.**

Follicles very slender, narrow; tips of corolla-lobes deflected 20. **Ichnocarpus.**

1. **Chilocarpus,** Blume.

Climbing shrubs. *Leaves* opposite, petioled, the main nerves horizontal, close and usually joining in an intramarginal nerve. *Flowers* small, in axillary cymes. *Calyx* short, eglandular; lobes 5. *Corolla* hypocrateriform, contracted at the throat; lobes 5, short, overlapping to the left, twisted to the right. *Stamens* inserted on the tube, included; anthers lanceolate, acute. *Disk* 0. *Ovary*

1-celled with 2 parietal placentas; ovules many, 2-seriate; style short; stigma ovoid or conical. *Fruit* a fleshy berry, at length 2-valved, pericarp thick. *Seeds* embedded in pulp with fibrous and corky arils; albumen copious, equable or ruminate; cotyledons flat; radicle elongate.

CHILOCARPUS ATRO-VIRIDIS, Bl.; F. B. I. iii. 626. *C. malabaricus*, Bedd. Ic. t. 175.

W. Ghâts in S. Canara, Malabar and Travancore, in evergreen forests up to 2,000 ft.

A large climber with milky juice and small whitish flowers and oblong abruptly acuminate shining leaves up to 5 in. long, 2 in. broad, the main nerves very many and parallel. The fruit is not known.

2. Carissa, Linn.

Much-branched spinous shrubs, erect or climbing. *Leaves* opposite, coriaceous, the spine-bearing pairs usually larger than the intermediate ones. *Flowers* in terminal and axillary pedunculate trichotomous cymes. *Calyx* 5-lobed, the lobes acute or acuminate. *Corolla* hypocrateriform; tube cylindric, dilated at top opposite the stamens, more or less pubescent within; lobes 5, usually overlapping to the right, about half the length of the tube. *Stamens* 5, on the corolla-tube, included; anthers lanceolate. *Ovary* 2-celled; ovules 1–4 in each cell, rarely more; style filiform; stigma fusiform or columnar, minutely 2-fid. *Fruit* an ellipsoid ovoid or globose berry, 2- or, by abortion, 1-celled. *Seeds* usually 2 or 4, peltately attached to the septum; albumen fleshy; cotyledons ovate; radicle inferior.

Corollas large, the tube over ·6, usually over ·75 in. long; berry 4-seeded :—

Spines straight, often 1·5 in. long, often forked at tip; leaves elliptic-oblong, obtuse or emarginate at apex, rounded or even subcordate at base, up to 3 in. long, 1·5 in. broad; cymes puberulous, the peduncles ·25–1 in. long; berry ·5–1 in. long, ellipsoid ..... 1. *Carandas.*

Spines curved, often 2 in. long, not forked; leaves ovate or elliptic-ovate or -lanceolate, acute or acuminate at apex, rounded or acute at base, up to 3·5 in. long, 2 in. broad; cymes puberulous or nearly glabrous, sessile; berry ·75–1 in. long, ellipsoid ..... 2. *inermis.*

Corollas medium-sized, the tube ·4–·6 or –·7 in. long; berry 4-seeded :—

Spines straight or very slightly curved; leaves broadly ovate or suborbicular, obtuse at apex, slightly cuneate at base, up to 2·5 in. long, 1·5 in. broad, the nerves about 5 pairs not prominent; cymes shortly peduncled, the corolla-lobes ciliate; berry globose, nearly ·5 in. diam. ..... 3. *congesta*.

Spines straight, stout, usually forked; leaves ovate or suborbicular, obtusely slightly acute and mucronate at apex, sometimes emarginate, rounded or slightly acute at base, up to 1·5 in. long, 1 in. broad, nerves about 6 pairs, prominent, the basal 2nd arched to meet the rest; cymes shortly peduncled; calyx-lobes long acuminate; berry ovoid ..... 4. *spinarum*.

Corollas small, the tube less than ·4 in. long; cymes shortly peduncled:—

Seeds 4; spines long and straight, up to 1·5 in. long, sometimes forked; branchlets and leaves softly grey-tomentose, the leaves elliptic oblong, obtuse or acute at apex, slightly cuneate at base, up to 2 in. long, 1 in. broad, the nerves about 8 pairs, the lowest pair oblique and arched to meet the rest; calyx-lobes ovate, villous; berry globose, ·2 in. in diam. ..... 5. *hirsuta*.

Seeds 2; spines straight; leaves glabrous:—

Leaves ovate-rhomboid, acute or obtuse and mucronate at apex, cuneate at base, up to 2 in. long, 1·3 in. broad, the nerves about 4 pairs, indistinct; calyx-lobes acuminate, pubescent; berry ovoid, ·25 in. in diam. ..... 6. *gangetica*.

Leaves narrowly elliptic- or oblong-lanceolate, acute at apex, cuneate at base, up to 2 in. long, ·5 7 in. broad, the nerves about 6 pairs, not prominent, the lowest 1–2 pairs oblique; calyx lobes ovate, acute, ciliate; berry ovoid, ·25 in. in diam. ..... 7. *salicina*.

Leaves elliptic-ovate or -lanceolate, acute at both ends, mucronate, up to 1·5 in. long, ·5 in. broad, the nerves 2–3 pairs, oblique and indistinct; calyx-lobes small, lanceolate, ciliate; berry ellipsoid, ·3 in. in diam. ..... 8. *paucinervia*.

1. CARISSA CARANDAS, Linn.; F. B. I. iii. 630; Roxb. Cor. Pl. t. 77; Wt. Ic. t. 426.

N. Circars, Deccan and Carnatic, in dry forests; often cultivated.

A large thorny shrub or small tree with white or pale rose-coloured flowers and red berry turning purple or black on ripening and good to eat, especially in tarts and preserves. Bark yellowish-brown; wood white with an irregular grey- or orange-yellow streaked heartwood, used to make combs and spoons and as fuel. The thorny branches are used for

fencing. Vern. *Hind.* Karaunda; *Ur.* Kerendo kuli; *Tel.* Kalivi; *Tam.* Kalaaha, Kila.

2. **Carissa inermis**, Vahl. *C. macrophylla*, Wall; F. B. I. iii. 631; *C. suavissima*, Bedd.; F. B. I. iii. 632.

N. Circars, hills of Vizagapatam (Barber); W. Ghâts, in almost all Districts, in evergreen forests, up to 6,000 ft.

A large climbing shrub with white flowers and edible purple fruit, sometimes, perhaps, found as a bush. Bark brown, rough, peeling off in small flakes; wood white, soft.

3. **Carissa congesta**, Wt. Ic. t. 1289. *C. Carandas*, Linn. var. *congesta*, Bedd.; F. B. I. iii. 631.

W. Ghâts, Mysore, Coorg and S. Canara.

An erect shrub with rather thin leaves and white flowers.

4. **Carissa spinarum**, Linn. Mant. 559; F. B. I. iii. 631. *C. diffusa*, Roxb.; Wt. Ic. t. 427.

N. Circars and Carnatic, down to S. Travancore, in dry scrub forests, less common inland.

A large thorny shrub with zigzag branches. Wood like that of *C. Carandas*. Vern. *Hind.* Karaunda; *Tam.* Chiru kila.

Var. *microphylla*, Gamble. Smaller with smaller leaves, often scarcely ·5–·75 in. long and prominently nerved and smaller flowers, the corolla-tube sometimes less that ·4 in.

Carnatic, from Madras southwards to S. Travancore, near the coast.

5. **Carissa hirsuta**, Roth. *C. spinarum* var. *hirsuta*, Hook. f.; F. B. I. iii. 631. *C. villosa*, Roxb.; Wt. Ic. t. 437.

Deccan and Carnatic, in dry hilly country, up to 3,000 ft.: Nellore (Ramaswami), Anantapur (Gamble), Walliar, Ayamalai Hills (Wight), Coimbatore (Fischer).

A thorny shrub with white flowers and black-purple berry, the grey-tomentose branchlets and leaves very characteristic, but sometimes nearly glabrous.

6. **Carissa gangetica**, Stapf in Herb. Kew.

N. Circars, Mahendragiri Hill in Ganjam at 4,500 ft. (Gamble, Fischer and Gage).

A thorny shrub.

7. **Carissa salicina**, Lamk. Encycl. i. 554.

Deccan, Hassanur in Coimbatore (Herb. Madras).

A thorny shrub with narrow leaves, the spines simple. Perhaps only a rather larger-leaved form of the next.

8. CARISSA PAUCINERVIA, A. DC.; F. B. I. iii. 631; Wt. Ic. t. 1290.

Deccan, hills of Mysore, Salem and Coimbatore; W. Ghâts, Nilgiri Hills at 4,000–6,000 ft. on E. side, common.

A diffuse bushy shrub with many sharp spines, white or slightly rose-coloured flowers and small dark purple edible berries.

3. Cerbera, Lipn.

Small glabrous trees. *Leaves* alternate or scattered, long, main nerves slender, horizontal and parallel. *Flowers* large, white or red, in pseudoterminal cymes. *Calyx* 5-lobed, eglandular, lobes long. *Corolla* large, tube cylindric below, funnel-shaped above the throat with 5 villous scales; lobes 5, spreading, overlapping to the left. *Stamens* small, included; anthers lanceolate, apiculate, the cells rounded at base. *Disk* 0. *Ovary* of 2 distinct carpels; ovules 4 in each carpel, on both sides of a thick placenta. *Fruit* of 1, rarely 2, globose or ellipsoid drupes; pericarp very thick, fibrous and woody. *Seeds* broad, compressed, peltately attached to the enlarged placenta; albumen none; cotyledons thin; radicle very short.

CERBERA MANGHAS, Linn. *C. Odollam*, Gaertn.; F. B. I. iii. 638; Wt. Ic t. 441.

E. and W. Coast, in salt swamps and backwaters.

A moderate-sized or small tree with lanceolate or oblanceolate bright green fleshy leaves, large white flowers and large green fruit with fibrous pericarp. Wood grey, very soft and spongy. Vern. *Tam.* Kada má, Kat arali; *Mal.* Othalam.

4. Rauwolfia, Linn.

Shrubs, glabrous or rarely pubescent. *Leaves* 3- to 4-nately whorled, rarely opposite, the main nerves slender and usually arched. *Flowers* in corymbose or umbellate cymes, the peduncles alternate with the terminal leaves or axillary. *Calyx* 5-lobed, eglandular. *Corolla*-tube cylindric, dilated opposite the stamens, the mouth constricted, the throat usually hairy within; lobes usually 5, overlapping to the left. *Stamens* 5, included, on the corolla-tube; filaments very short; anthers small, acute, the cells rounded at base. *Disk* cup-shaped or annular. *Ovary* of 2

distinct or connate carpels; ovules 2 in each carpel, collateral; style filiform; stigma calyptriform at the base, the tip bifid. *Fruit* of 2 connate or distinct drupes, each with a crustaceous 1-seeded pyrene. Seeds ovoid; testa thin; albumen fleshy; cotyledons flat; radicle superior.

Corolla-tube long and slender, about ·5 in., narrow, dilated a little above the middle, lobes ·15 in. long; calyx lobes short; cymes closely corymbose on single peduncles 2–5 in. long; drupes slightly connate, obliquely ovoid, ·25 in. long, pyrenes slightly rugose; leaves in whorls of 3, thin, lanceolate, acute or acuminate, the main nerves rather distant, oblique
1. *serpentina.*

Corolla-tube about ·25 in. long, broad, dilated at the top, lobes long, rounded; calyx-lobes long and slender; cymes rather lax, on peduncles about 1–2 in. long, several together; drupes distinct, ellipsoid, about ·5 in. long, pyrenes very rugose; leaves oblanceolate, in whorls of 3–4, pale beneath, the main nerves many, subhorizontal, regular
2. *densiflora.*

Corolla-tube short and narrow, slender, dilated at top, lobes short; calyx-lobes very short:—

Cymes lax, few-flowered, on peduncles about 1·5 in. long, usually 2 together; drupes joined to the middle, ovate, acute, ·2 in. long, pyrenes rugose; leaves elliptic-lanceolate or -oblanceolate, long-acuminate, usually in whorls of 3, the main nerves very slender, about 12 pairs
3. *micrantha.*

Cymes very lax, few-flowered, on single slender peduncles about 4 in. long, the divaricate branches also long and slender; drupes joined to the middle, ovate, acute, ·3 in. long, pyrenes scarcely rugose; leaves oblanceolate, acuminate, very thin, in whorls of 3 of unequal size, the main nerves many, close and regular.....4. *Beddomei.*

Corolla-tube short, about ·1 in. long, broad, lobes very short, rounded; calyx-lobes short, round, ciliate; drupes joined to the top, ovoid, ·2 in. long, pyrenes rugose; leaves in whorls of about 4, very unequal in size, elliptic, acute .....*canescens.*

1. RAUWOLFIA SERPENTINA, Benth. ex Kurz; F. B. I. iii. 632. *Ophioxylon serpentinum*, Linn.; Wt. Ic. t. 849.

W. Ghâts, in all Districts, in moist forest undergrowth, at low levels and up to 3,000 ft.

A herbaceous undershrub with red pedicels and calyx, white corolla and purplish-black fruit. The root is used in medicine. *Hind.* Chota chand; *Tel.* Patalgani; *Tam.* [illegible] nagipodi.

2. RAUWOLFIA DENSIFLORA, Benth. ex Hook. f.; F. B. I. iii. 633. *Ophioxylon ceylanicum*, Wt. Ic. t. 1291. *O. neilgherrense*, Wt. Ic. t. 1292.

E. Ghâts, Rumpa Hills of Godavari, 4,000 ft. (Gamble); W. Ghâts, Nilgiris, Pulneys, Anamalais and hills of Tinnevelly and Travancore, at 4,000–7,000 ft.

A rather large shrub, sometimes reaching 12 ft. in height with white or pink flowers and brownish-purple fruit.

3. RAUWOLFIA MICRANTHA, Hook. f.; F. B. I. iii. 633.

W. Ghâts, Malabar (Wight) and Travancore (Rama Rao) near Kottyam.

A slender shrub, apparently very scarce.

4. RAUWOLFIA BEDDOMEI, Hook. f.; F. B. I. iii. 634. *Tabernaemontana verticillata*, Bedd. Fl. Sylv. clix.

W. Ghâts, hills of Tinnevelly and Travancore (Beddome).

A large dichotomously branched glabrous shrub with very slender inflorescence and pointed carpels.

R. canescens, Linn., is a small W. Indian shrub found in gardens and sometimes run wild in the neighbourhood of Madras. The fruits are red.

5. Hunteria, Roxb.

Glabrous trees. *Leaves* opposite, coriaceous, shining, with many slender main nerves. *Flowers* in short terminal axillary or subterminal cymes. *Calyx* small, 5-lobed, eglandular. *Corolla* salver-shaped, tube cylindric, slightly dilated near the top, lobes overlapping to the left. *Stamens* inserted at the dilation of the tube; anthers lanceolate, the cells rounded at base. *Disk* 0. *Ovary* of 2 carpels; ovules 2–4 to each carpel. *Fruit* of 2 stalked fleshy ovoid berries, each 1-seeded or 2-celled by the intruded placenta. *Seeds* ovoid or oblong; albumen fleshy; cotyledons ovate; radicle straight.

HUNTERIA CORYMBOSA, Roxb.; F. B. I. iii. 637; Wt. Ic. t. 428; Bedd. Fl. t. 265.

Var. *Roxburghiana*, Trim. *H. Roxburghiana*, Wt. Ic. t. 1294.

W. Ghâts, evergreen forests of Travancore and Tinnevelly at 1,000–2,000 ft.

A small tree with pale yellow flowers and narrow linear lanceolate shining leaves with many nearly parallel main

nerves meeting in an intramarginal nerve and up to 6 in. long, ·75 in. broad. Bark light brown, thin; wood brownish yellow, hard and close-grained.

6. Lochnera, Reichb.

Annual or perennial herbs or undershrubs. *Leaves* opposite, axillary glands numerous. *Flowers* axillary, solitary or in pairs, white or pink. *Calyx* 5-lobed, eglandular; lobes subulate. *Corolla* salver-shaped; tube slender, cylindric, inflated over the stamens below the constricted mouth; lobes overlapping to the left. *Stamens* on the corolla-tube; anthers lanceolate, acute. *Disk* of 2 linear glands. *Ovary* of 2 free carpels; ovules numerous, 2-seriate; style filiform; stigma depressed-capitate with a reflexed hyaline frill at base, the apiculus 2-lobed. *Fruit* of 2 half divaricate slender cylindric follicles. *Seeds* numerous, small; testa muriculate; albumen fleshy; cotyledons flat, shorter than the thick radicle.

LOCHNERA PUSILLA, K. Schum. *Vinca pusilla*, Murr.; F.B.I. iii. 640.

Plains Districts of the Circars, Deccan and Carnatic, up to 2,000 ft., a common weed, more scarce on W. Coast.

A branching glabrous annual with small white flowers, follicles about 2 in. long and lanceolate membranous leaves, the seeds oblong, black and muriculate in lines. Said to be poisonous to cattle (Lawson).

L. rosea, Reichb., is a common garden shrub with rose-coloured or white flowers and obovate shining leaves. It probably came from the W. Indies and is sometimes found run wild.

7. Alstonia, R. Br.

Trees or shrubs, branches often in whorls. *Leaves* generally whorled, rarely opposite, often with numerous nearly horizontal parallel main nerves. *Flowers* in subterminal corymbose cymes. *Calyx*-tube short; lobes 5, eglandular. *Corolla* salver-shaped; tube cylindric, dilated opposite the stamens; lobes overlapping either to the right or left. *Stamens* usually near the top of the tube, included; anthers acute. *Disk* annular or lobed or 0, if lobed the lobes 2 alternate with the carpels. *Ovary* of 2 distinct

carpels; ovules many in each carpel, many-seriate; style filiform; stigma oblong or cylindric, bifid at apex. *Fruit* of 2 linear slender follicular mericarps. *Seeds* linear or oblong, flattened, peltately attached, furnished with tufts of long brown hairs at each end; testa thin, often papillose; albumen scanty; cotyledons oblong, flat; radicle superior.

A large tree, branches whorled; leaves 4–7 in a whorl, coriaceous, elliptic-oblong or obovate or oblanceolate, obtuse at apex, pale beneath; flowers in umbellate cymes, the corolla-tube short; follicles 1–2 ft. long; seeds papillose ..... 1. *scholaris*.

A shrub, branches opposite or whorled; leaves 3–6 in a whorl, membranous, narrowly oblong-lanceolate, acuminate at apex, slightly pale beneath; flowers in corymbose cymes, the corolla-tube long; follicles 3–5 in. long; seeds not papillose ..... 2. *venenata*.

1. ALSTONIA SCHOLARIS, R. Br.; F. B. I. iii. 642; Wt. Ic. t. 422; Bedd. Fl. t. 242.

   N. Circars, not very common; Deccan, in deciduous forests; W. Ghâts, in all Districts, both in deciduous and evergreen forests, up to 2,000 ft.

   A large evergreen tree with greenish white flowers and long very narrow pendulous follicles. Bark dark grey, rough, lenticellate; wood white, soft, even-grained, used for boxes and temporary purposes, but not durable. Vern. *Hind.* Satiún; *Ur.* Chhatiana; *Tel.* Eda-kula; *Tam.* Mukampalei; *Mal.* Pala.

2. ALSTONIA VENENATA, R. Br., F. B. I. iii. 642; Wt. Ic. t. 436.

   N. Circars, hills of Ganjam and Godavari, up to 2,000 ft.; W. Ghâts, hills of Coimbatore, Nilgiris, Anamalais, Pulneys and hills of Tinnevelly, up to 6,000 ft.

   A shrub with long white flowers and fusiform follicles stalked and beaked, the leaves long and very closely nerved. Bark thin, light brown, wood white, even grained.

8. Ellertonia, Wight.

Glabrous climbing shrubs. *Leaves* opposite or 3–4-nately whorled. *Flowers* slender, in subterminal cymes. *Calyx* small, eglandular, lobes 5. *Corolla* salver-shaped; tube cylindric, slightly dilated over the stamens; throat naked, constricted;

lobes 5, narrow, overlapping to the left. *Stamens* in the middle of the tube, included; anthers lanceolate, apiculate, the cells obtuse at base. *Disk* 0. *Ovary* of 2 distinct carpels; ovules numerous in each carpel; style filiform; stigma oblong with a 2-fid apiculus. *Fruit* of 2 completely divaricate linear terete follicles. *Seeds* 2-seriate, flattened, peltately attached to the placenta, winged at both ends; testa membranous; albumen scanty; cotyledons thin, elliptic-oblong; radicle superior.

ELLERTONIA RHEEDII, Wt. Ic. t. 1295; F. B. I. iii. 641.

W. Ghâts, evergreen forests from Coorg to Travancore and Tinnevelly, up to 3,000 ft.

A climber with elliptic acuminate leaves about 3 in. long, slender flowers and divaricate follicles about 5 in. long, spotted outside and with seeds acuminately winged below, rounded above, in all nearly 1 in. long, ·2 in. broad in the middle.

9. Holarrhena, R. Br.

Trees or shrubs. *Leaves* opposite, membranous, glabrous or pubescent. *Flowers* white, in terminal or axillary corymbose cymes. *Calyx* 5-lobed, usually glandular within at the base; lobes narrow. *Corolla* salver-shaped; tube slender, cylindric, slightly dilated opposite to the stamens; lobes oblong or obovate, overlapping to the right. *Stamens* near the base of the tube, included; anthers lanceolate, mucronate, the cells rounded at the base. *Disk* none. *Ovary* of 2 distinct carpels; ovules many in each carpel; style short; stigma oblong-fusiform, the tip bifid. *Fruit* of 2 terete elongate follicular mericarps connected at the tip, then free. *Seeds* linear or oblong, concave within, tipped at the apex with a deciduous coma of long silky brown hairs; albumen scanty; cotyledons broad, complicate, radicle short, superior.

HOLARRHENA ANTIDYSENTERICA, Wall.; F. B. I. iii. 644; Brand. For. Fl. t. 40. *H. Codaga*, G. Don; Wt. Ic. t. 1297. *Chonemorpha* (?) *antidysenterica*, G. Don; Wt. Ic. t. 439.

All Forest Districts, in deciduous forests, up to 3,000 ft., common.

A small tree with white flowers, very long narrow pendulous follicles and large membranous, glabrous or pubescent, ovate to ovate-oblong or elliptic leaves. Bark thick, brown rough;

wood white, soft, even grained, used for carving and turning in N. India, rarely in the South. Vern. *Hind.* Karchi; *Ur.* Kherwa; *Tel.* Pala, Kodaga; *Tam.* Vepali; *Mal.* Kodaga pala.

10. Rejoua, Gaudich.

Small trees, with resinous exudations at the bases of the leaves, at the bifurcations of the inflorescence and on the flower buds. *Leaves* opposite, coriaceous, main nerves strong, horizontal, impressed. *Flowers* in stout long-peduncled cymes. *Calyx* thick; lobes 5, suborbicular with many glands at the base within. *Corolla* large, salver-shaped; tube cylindric, swollen at the base; lobes oblong, falcate, overlapping to the left. *Stamens* 5, half-way down the tube; anthers lanceolate, their base rounded. *Ovary* of 2 carpels; ovules numerous; style short; stigma bifid. *Fruit* of 1–2 large recurved follicular mericarps. *Seeds* many, buried in red pulp, without coma; albumen copious; cotyledons flat.

REJOUA DICHOTOMA, Gamble n. comb. *Tabernaemontana dichotoma*, Roxb.; F. B. I. iii. 645; Wt. Ic. t. 433.

W. Ghâts, Malabar, at low levels.

A small tree with stout woody resinous branches, oblong or obovate coriaceous leaves with about 20 main nerves at right angles to the midrib and meeting in loops, impressed above. Flowers large, white with a yellow tube; follicles 4–5 in. long, 1–2 in. broad, orange-yellow.

11. Ervatamia, Stapf.

Shrubs or small tree, usually glabrous. *Leaves* opposite; axillary stipules usually distinct; axillary glands small, often numerous. *Flowers* in terminal or axillary corymbose or umbelliform cymes, often in pairs; branches dichotomous. *Calyx* small; lobes 5, free or connate at the base, glandular inside. *Corolla* salver-shaped; tube cylindric, slightly dilated towards the naked mouth, opposite the stamens, villous below the dilation; lobes 5, overlapping to the left or right, much folded in bud. *Stamens* included; filaments short; anthers linear, acute or mucronate. *Disk* 0. *Ovary* of 2 carpels, distinct or slightly cohering; ovules numerous, many-seriate; style long, filiform; stigma clavate or oblong with a bifid apiculus. *Fruit* of 2 follicular mericarps, coriaceous when mature, obliquely ovoid to

lanceolate, usually curved and beaked, dehiscing along the ventral suture and often opening out flat. *Seeds* few to many, enveloped in an orange or red aril, grooved ventrally; testa crustaceous, furrowed; albumen copious, waxy; cotyledons flat, cordate; radicle cylindric.

Lobes of corolla overlapping to left, in bud ovate acute; corolla-tube ·5–1 in. long, dilated below the middle; leaves obovate or oblanceolate, acuminate or caudate at apex, 3–6 in. long, main nerves 6–8; follicles spreading, oblong, acuminate, 3–6-seeded .....1. *coronaria.*

Lobes of corolla overlapping to right, in bud nearly globose:—

Corolla-tube slender and narrow, ·6–·8 in. long, dilated at or a little above the middle; calyx-lobes unequal, oblong, ciliate; follicles ovate, long beaked, 1–(?)-seeded; leaves elliptic-obovate, long and abruptly caudate acuminate at apex, up to 5 in. long, 2 in. broad, main nerves regular, about 10–12 pairs, arched .....2. *caudata.*

Corolla-tube thick, ·8–1 in. long, dilated at top; calyx-lobes obtuse or emarginate, thick; follicles oblong, up to 1·5 in. long, usually with short recurved beaks; seeds about 5; leaves elliptic-oblong or -lanceolate, shortly acuminate at apex, up to 8 in. long, 3 in. broad, main nerves regular, prominent, 12–16 pairs, arched .....3. *Heyneana.*

1 ERVATAMIA CORONARIA, Stapf in Fl. Trop. Afr. iv. 127. *Tabernaemontana coronaria*, R. Br.; F. B. I. iii. 646; Wt. Ic. t. 477.

N. Circars, hills of Vizagapatam at 2,500 ft. (A. W. Lushington), the slender-flowered wild form of N. India. The form commonly cultivated in gardens has a thick corolla-tube, and is often with double flowers.

A shrub reaching 6–8 ft. in height, with white scented flowers, the crustaceous seeds with a red fleshy aril Vern. *Hind.* Togar.

2. ERVATAMIA CAUDATA, Gamble in Kew Bull. 1921, 310.

W Ghâts, Anamalai Hills (Barber, Fischer); hills of Tinnevelly (Wight, Barber, Hooper and Ramaswami), at 2,500–4,000 ft., in evergreen forest.

A shrub with white flowers and (one specimen only seen) 1-seeded follicle.

3. ERVATAMIA HEYNEANA, T. Cooke Fl. Bomb. ii. 134. *Tabernaemontana Heyneana*, Wall.; F. B I. iii. 646.

W Ghâts, in Malabar and Travancore, in open forest, up to 3 000 ft.

A small deciduous tree with white flowers and orange-yellow follicles, the seed arils red. Bark grey; wood white and pale grey in streaks, smooth, moderately hard. Vern. *Mar.* Nág kuda.

12. Parsonsia, R. Br.

Twining shrubs. *Leaves* opposite. *Flowers*, small, white, in terminal or axillary dichotomous cymes or thyrses. *Calyx* 5-lobed; tube with 5 scales within or eglandular. *Corolla* salver-shaped; tube short, cylindric or globose, the throat naked; lobes 5, overlapping to the right. *Stamens* inserted on the tube; filaments often spirally twisted; anthers half-exsert, oblong-lanceolate or linear, acute, conniving round the stigma and adhering to it, the cells spurred and empty below. *Disk* of 5 lobes or scales. *Ovary* 2-celled, cells many-ovuled; style filiform, the top dilated, truncate; stigma columnar or elongate-conic. *Fruit* of 2 follicular mericarps, long cohering, but at length separated from the 2 placentas. *Seeds* linear or fusiform, attenuated at the ends, with a coma of long silky hairs; testa striate; albumen scanty; cotyledons linear-oblong, flat; radicle superior.

PARSONSIA SPIRALIS, Wall.; F. B. I. iii. 650. *Heligme Rheedii*, Wt. Ic. t. 1303.

W. Coast, along backwaters in Travancore; W. Ghâts, Hills of Coimbatore and Anamalais up to 3,000 ft.; Kollimalai hills of Trichinopoly.

A glabrous twining shrub with large subcoriaceous elliptic ovate or lanceolate acute leaves up to 6 in. long, 3 in. broad, sometimes slightly cordate at base, the flowers white.

13. Vallaris, Burm.

Twining shrubs, rarely trees. *Leaves* opposite, minutely dotted. *Flowers* white, in axillary or supra-axillary dichotomous cymes, often reduced to fascicles. *Calyx* 5-lobed, glandular or not inside; lobes narrow. *Corolla* salver-shaped or sub-rotate, throat naked; lobes broad, spreading, overlapping to the right. *Stamens* inserted at the top of the tube of the corolla, exsert; filaments short; anthers connivent in a cone round the stigma and adherent to it, the connective with an often large dorsal gland; cells with rigid basal spurs. *Disk* annular or cupular, 5-lobed. *Ovary* of 2 carpels, connate at first, ovules many; style filiform;

stigma thick, annular at base, often 2-lobed at tip. *Fruit* of 2 follicles at first joined, at length separating with the placentas detached. *Seeds* 2-seriate, rounded below, attenuate above in a beak with a long white coma; testa rugose; albumen scanty; cotyledons thin or thick and fleshy, large; radicle cylindric, superior.

VALLARIS SOLANACEA, O. Kze. *V. Heynei*, Spreng.; F. B. I. iii. 650. *V. dichotoma*, Wall.; Wt. Ic. t. 438.

Deccan and Carnatic, in dry forests and hedges, also on W. Coast; sometimes cultivated.

A large twining straggling shrub with pretty large open white flowers and elliptic or lanceolate dotted leaves up to 4 in. long, 1·5 in. broad, the follicles 6 in. long, the seeds hollowed on the face. Bark yellowish-grey, wood white. Vern. *Hind.* Ramsar.

14. Wrightia, R. Br.

Shrubs or small trees, branches slender. *Leaves* opposite. *Flowers* white yellow or red, in terminal or pseudo-axillary cymes. *Calyx* short, 5-lobed, with glands or scales within. *Corolla* salver-shaped; tube usually short, cylindric; throat with a corona in 1–2 series of erect, simple lobed or fimbriate scales, distinct or united in a ring; lobes overlapping to the left. *Stamens* inserted on the mouth of the tube; filaments short, dilated; anthers exsert, sagittate, connivent around and adhering to the stigma, cells spurred at the base. *Disk* 0. *Ovary* of 2 free or connate carpels, ovules many; style filiform; stigma ovoid with usually a toothed basal ring. *Fruit* of 2 connate or distinct follicular mericarps. *Seeds* linear, attenuate at the apex, the base with a deciduous coma; albumen scanty or 0; cotyledons broad, convolute; radicle short, superior.

Leaves glabrous or puberulous beneath; corona-scales fimbriate; follicles smooth, distinct, cohering at the apex only .....1. *tinctoria.*
Leaves tomentose on both sides; corona-scales oblong, entire or lobed; follicles rough with white tubercles, connate throughout ....2. *tomentosa.*

1. WRIGHTIA TINCTORIA, R. Br.; F. B. I. iii. 653; Wt. Ic. t. 444; Bedd. Fl. t. 241.

All Forest Districts, in deciduous forest, especially in the Deccan, less so in the Circars and W. Ghâts, up to 4,000 ft. in the hills.

A small deciduous tree with white flowers and narrow follicles joined at the tips and with the long coma of the seeds at the base (in the somewhat similar *Holarrhena* they have it at the apex). Leaves variable, elliptic ovate or oblong, acuminate or caudate. Bark pale, smooth; wood white, even grained, useful for carving. The leaves give a blue dye. Vern. *Hind.* Dudhi; *Tel.* Tella pala; *Tam.* Nila palai; *Mal.* Aiya pala.

Var. *Rothii*, Hook. f. *W. Rothii*, G. Don; Wt. Ic. t. 1319. Branches, inflorescence and leaves beneath puberulous. Deciduous bracts often pink or lilac. Some Godavari specimens have large leaves tomentose beneath and follicles up to 18 in. long.

Dry forests of Hyderabad and the Ceded Districts, north to the Circars.

2. **Wrightia tomentosa**, Roem. & Sch.; F B. I. iii. 653; Wt. Ic. t. 443. *W. Wallichii*, A. DC.; Wt. Ic. t. 1296.

All Forest Districts, in deciduous forest, chiefly in the Circars, Deccan and Carnatic, less common in the South, up to 4,000 ft. in the hills.

A small deciduous tree with yellowish flowers, the coronal scales orange, connate follicles and ovate or obovate tomentose leaves, the white coma of the seeds at the base. Bark grey, corky; wood white, moderately hard, even-grained, useful for carving. Vern. *Hind.* Dudhi; *Ur.* Pal kurwán; *Tel.* Tella pala; *Tam.* Pala; *Mal.* Mailam pala.

15. Strophanthus, DC.

Small trees or shrubs, often climbing. *Leaves* opposite. *Flowers* usually large, in terminal cymes, bracts prominent. *Calyx* 5-lobed, the tube usually glandular within. *Corolla* funnel-shaped, tube short, widening to a campanulate throat, with 10 free or connate corona scales; lobes overlapping to the right, produced in short or long often twisted tails. *Stamens* inserted at the top of the tube, included; filaments short; anthers sagittate, their tips filiform, connivent round and adnate to the stigma, the cells spurred at the base. *Disk* 0 *Ovary* of 2 distinct carpels, ovules many; style filiform, rugose; stigma columnar or conical, simple or 2-fid at apex. *Fruit* of 2 oblong or elongate spreading follicular mericarps *Seeds* compressed, fusiform, narrowed to a feathery-

plumose point, base with a deciduous tuft of hairs; albumen scanty; cotyledons plano-convex.

Lobes of the corolla long and slender, up to about 2 in. in length, much longer than the tube; calyx-lobes subulate, ·3 in. long; leaves elliptic-oblong, cuspidate-acuminate, up to 3·5 in. long, 1·5 in. broad, main nerves about 6 pairs, curved from the base .....1. *Wallichii.*
Lobes of the corolla ·25–·5 in. long, broad and obtuse at tip, about as long as the tube; calyx-lobes ovate, ·1 in. long; leaves elliptic or elliptic obovate, acute, up to 3 in. long, 1·5 in. broad, main nerves 6–10 pairs, straight at first, curved only near the margin .....2. *Wightianus.*

1. STROPHANTHUS WALLICHII, A. DC.; F. B. I. iii. 655. *S. dichotomus*, Wall.; Wt. Ic. t. 59, *not of* DC.
   N. Circars, in the mountains (*teste* Roxburgh).
   A climbing shrub with ash-coloured bark with pink (Roxburgh) flowers and very long filiform anther-tails, the cymes loosely corymbose with many bracts.
2. STROPHANTHUS WIGHTIANUS, Wall.; F. B. I. iii. 656; Wt. Ic. t. 1301.
   W. Coast, in Malabar and Travancore.
   A climbing shrub with warted bark, closely corymbose cymes, anthers with rather short tails and thick woody follicles.

16. Beaumontia, Wall.

Large climbing shrubs. *Leaves* opposite. *Flowers* very large, white, in terminal cymes; bracts leafy. *Calyx* 5-lobed, glandular or not within; lobes foliaceous. *Corolla* funnel-shaped or campanulate, throat naked; lobes broad, overlapping to the right. *Stamens* inserted on the corolla-tube, included; filaments long, often spirally twisted; anthers horny, sagittate, conniving round and adhering to the stigma, the cells spurred at the base. *Disk* deeply 5-lobed. *Ovary* 2-celled; ovules many in each cell; style filiform; stigma oblong-fusiform. *Fruit* long, thick, woody, at length separating into 2 spreading follicular mericarps. *Seeds* compressed, lanceolate or oblong, attenuated at apex and surmounted by a coma; testa rugose; albumen thin; cotyledons thick, foliaceous; radicle short, superior

BEAUMONTIA JERDONIANA, Wt. Ic. tt. 1314–15; F. B. I. iii. 661.
W Ghats, Coorg and Wynaad.

A large climbing shrub with woody stem, large white funnel-shaped flowers and cylindric follicles 10 in. long.

B. grandiflora, Wall., a species from the E. Himalaya, is grown sometimes in gardens for its beautiful bell-shaped white flowers.

17. Chonemorpha, G. Don.

Stout climbing shrubs. *Leaves* opposite, large and broad. *Flowers* large, white, in lax terminal and pseudo-axillary bracteate paniculate cymes. *Calyx* tubular, with a ring of glands at the base inside; lobes 5. *Corolla* salver-shaped; tube cylindric, slightly expanded at base and throat; lobes 5, broad, overlapping to the right, sharply twisted to the left. *Stamens* inserted on the corolla-tube, included, filaments short, broad, villous; anthers sagittate, acuminate, the cells shortly incurvedly spurred below. *Disk* thick, annular or cupular. *Ovary* of 2 distinct carpels; ovules many; style filiform, cleft below; stigma conoid or subclavate. *Fruit* of 2 long, straight, woody, parallel, follicular mericarps. *Seeds* ovoid, produced in a beak, surmounted by a long white silky coma; testa smooth; albumen scanty; cotyledons flat, thick, oblong, radicle short, superior.

CHONEMORPHA MACROPHYLLA, G. Don; F. B. I. iii. 661; Wt. Ic. t. 432; Bot. Mag. t. 7492.

W. Ghâts, at low levels, and W. Coast, in moist forests.

A large climber with milky juice, large nearly orbicular leaves, fulvous tomentose beneath, very large fragrant white flowers, the corolla-lobes often 2 in. long and 1·5 in. broad, and follicles about a foot long.

18. Aganosma, G. Don.

Evergreen climbing shrubs. *Leaves* opposite. *Flowers* medium-sized or large, in terminal tomentose cymes; bracts many. *Calyx* divided nearly to the base in 5 narrow linear-lanceolate lobes, each with 2 small subulate glands at the base. *Corolla* salver-shaped; tube with lower part very short; upper part long, cylindric, with bearded longitudinal bands behind the anthers; lobes lanceolate linear-oblong or rounded, overlapping to the right. *Stamens* inserted at the base of the upper part of the corolla-tube, included; anthers sagittate, conniving over and

adherent to the stigma, the cells spurred at base. *Disk* cupular, 5-lobed. *Ovary* of 2 distinct, usually hirsute, carpels; ovules many; style straight; stigma columnar. *Fruit* of 2 short or long, terete or curved, follicular mericarps. *Seeds* ovate or oblong, flattened, glabrous, with a white silky coma at tip; albumen scanty; cotyledons oblong; radicle short, superior.

Cymes laxly corymbose; calyx-lobes linear-lanceolate, about ·7 in. long, conspicuous; corolla rather large, lobes broadly falcate, ·4 in. long, ·25 in. broad; leaves ovate or elliptic, with 3 pairs of main nerves; follicles short, curved upwards, up to 8 in. long, glabrous but roughly scurfy; seeds hollowed near the top ..... 1. *dichotoma.*
Cymes densely corymbose; calyx-lobes linear, ·3–·4 in. long; corolla rather small, lobes ovate acuminate, ·15–·3 in. long; leaves elliptic or elliptic-lanceolate, acute or acuminate, sometimes (in dry regions) obtuse or even emarginate, with 5–8 pairs of main nerves; follicles straight, 6–9 in. long, tomentose at first, afterwards glabrous; seeds flat, slightly concave on one side ..... 2. *cymosa.*

1. AGANOSMA DICHOTOMA, K. Schum *A. caryophyllata*, G. Don; F. B. I. iii. 662. *A. Blumei*, Wt. Ic. t. 1305, *not of* A. DC.

   N. Circars. E. Deccan and Carnatic from Ganjam to the Rumpa Hills, Kondapalli in Kistna and the Nellore Veligondas.

   A large climber with white corolla and red calyx lobes and leaves up to 4 in. long, tomentose at first, afterwards glabrescent.

2. AGANOSMA CYMOSA, G. Don; F. B. I. iii. 663. *A. elegans*, G. Don; Wt. Ic. t. 1304. *A. Doniana*, Wt. Ic. t. 1306. *Echites cymosa*, Roxb.; Wt. Ic. t. 395. *Toxocarpus eriocarpus*, Hook. f.; F. B. I. iv. 15?

   Deccan, Carnatic and W. Ghâts, in forest Districts, up to 5,000 ft.

   A large rambling climber with pale yellow flowers variable in size, and leaves also variable, up to 5 in. long but usually less.

19. Anodendron, A. DC.

Glabrous climbing shrubs. *Leaves* opposite with distant nerves. *Flowers* small, in axillary or axillary and terminal spreading paniculate cymes; bracts small. *Calyx* small, 5-lobed, usually

without glands. *Corolla* salver-shaped; tube cylindric, little dilated opposite the stamens, the mouth contracted; lobes 5, overlapping to the right, twisted to the left. *Stamens* included, below the middle of the corolla-tube; anthers sagittate, connivent round and adherent to the stigma; cells shortly spurred at base. *Disk* cup-shaped. *Ovary* of 2 distinct carpels, sunk in the disk and dorsally adnate to it; ovules many; style short; stigma thick, conical. *Fruit* of 2 diverging, hard, acuminate, follicular mericarps. *Seeds* ovoid or oblong, compressed, beaked, tipped with a long silky coma; albumen scanty; cotyledons oblong, flat, leafy; radicle cylindric, superior.

ANODENDRON PANICULATUM, A. DC.; F. B. I. iii. 668; Wt. Ic. t. 1309, *fruit and seeds only*. *Echites paniculata*, Roxb.; Wt. Ic. t. 396.

N. Circars, in Ganjam (Barber); Deccan, in Mysore; W. Ghâts from S. Canara and Coorg to Travancore, in the low country in dry open forests.

A very large climber with large panicles of small yellow flowers, elliptic or oblong abruptly acuminate leaves with 12–15 pairs of regular prominent main nerves, and follicles 6 in. long, the seeds long-beaked. Vern. *Mar.* Lamtani.

20. Ichnocarpus, R. Br.

Climbing shrubs with slender branches. *Leaves* opposite. *Flowers* small, in lax terminal and axillary paniculate cymes. *Calyx* 5-lobed, glandular or not within. *Corolla* salver-shaped, the throat contracted or villous, lobes overlapping to the right, the upper half deflexed in bud. *Stamens* inserted at or below the middle of the tube; filaments very short; anthers sagittate, conniving over and adhering to the stigma; cells spurred at the base. *Disk* free, with 5 erect disk glands. *Ovary* of 2 distinct carpels; ovules many; style short, the top obconic; stigma columnar. *Fruit* of 2 slender, spreading or divaricate, follicular mericarps. *Seeds* narrowed at the tip, crowned with a deciduous silky coma; albumen scanty; cotyledons long, flat; radicle short, superior.

ICHNOCARPUS FRUTESCENS, R. Br.; F. B. I. iii. 669; Wt. Ic. t. 420.

All Districts in the plains and lower hills, in forests, hedge rows and open places, common.

A much-branched, extensively climbing, rusty-villous shr with elliptic or lanceolate leaves up to 3 in. long, 1·5 broad, greenish-white flowers and slender follicles.

Allamanda cathartica, Linn., is a handsome climbing shr from S. America, with large yellow flowers and whorled leav frequently grown in gardens in the plains, and sometimes, along backwaters in Travancore, found run wild.

Thevetia neriifolia, Juss., is another S. American plant, erect bush or small tree with large yellow flowers, linear altern leaves and a rounded somewhat angular apple-like fruit, v common in gardens and occasionally found run wild near tov and villages.

Plumeria acutifolia, Poiret, is the Pagoda tree, probably a from tropical America, a common and conspicuous garden pl with thick fleshy branchlets and green oblong leaves, the flow white with a pale yellow centre, very fragrant and used garlands for the temples. *P. alba*, Linn., is also found in simi places in cultivation. It has large white flowers and th reticulate leaves.

Kopsia fruticosa, A. DC., is a large evergreen shrub, native Burma, common in gardens. It has pretty pink flowers a rather thin elliptic-lanceolate leaves.

Nerium odorum, Soland, the Indian Oleander, is a large shr common in rocky river beds in N. India, but not found wi except perhaps as an escape, in Madras. It is often cultivated gardens and has pink flowers, narrow linear coriaceous leaves a long follicles with brown coma to the seeds.

Family C. ASCLEPIADACEAE.

Herbs or shrubs, usually twining, the stems usually woo sometimes succulent. *Leaves* opposite or whorled, rarely alt nate, sometimes wanting; stipules 0. *Flowers* hermaphrodi regular, solitary or few or many together, usually in axilla sometimes terminal, umbelliform cymes; bracts usually small wanting. *Calyx* inferior, usually deeply 5-lobed, the lobes imb cate, usually with glandular scales at the base within. *Coro* various, gamopetalous, 5-lobed; tube usually short (long *Ceropegia*), often furnished within with processes forming *corolline corona*; lobes imbricate, contorted or valvate, oft

recurved, sometimes erect and connate at their tips. *Stamens* 5, inserted at or near the base of the corolla and alternating with its lobes; filaments free or more usually connate in a *staminal-column* with its apex united to the dilated part of the style; usually with more or less fleshy processes on the back forming a *staminal corona*; anthers 2-celled, the cell dehiscing by longitudinal or transverse slits, the tips often produced into inflexed membranes; pollen contents of each anther-cell granular or united into one or two *pollen-masses*; when granular each granule formed of about 4 grains loosely united and contained in a spoon- or trowel-like appendicle, attached by a *caudicle* to the *pollen-carrier* on the *style-apex*; when united, the pollen-masses of two adjacent but different anther cells either sessile on or connected by arm-like *caudicles* to one of the 5 usually horny *pollen-carriers* which rest on the angles of the *style-apex*. *Ovary* of 2 1-celled many-ovuled carpels, the styles united above and dilated in the style-apex bearing the pollen-carriers on its angles and beneath them the 5 stigmatic cavities. *Fruit* of 2 (or 1 by suppression) follicular mericarps, dehiscing by the ventral suture and usually liberating the placenta. *Seeds* usually flat, sometimes ovoid or cylindric, often marginal, crowned with a *coma* of long silky hairs; testa thin or thick, albumen usually thin; embryo large; cotyledons flat; radicle superior, usually cylindric.

Pollen-masses granular, loosely contained in the more or less spathulate appendicles, which are attached by a long or short caudicle to a gland which itself is attached to the angles of the style-apex (Tribe I. PERIPLOCEAE):—

Corona-processes connate with the corolla:—
- Corolla-tube shorter than the lobes:—
  - Corolla-lobes valvate ..... 1. **Hemidesmus.**
  - Corolla-lobes imbricate, overlapping to the right .. 2. **Cryptolepis.**
- Corolla-tube as long as or longer than the lobes ..... **Cryptostegia.**

Corona-processes connate with the stamens:—
- No glands between the stamens; corolla rotate:—
  - Shrubs with clustered narrow leaves; filaments short, slender 3. **Utleria.**
  - Climbers with opposite elliptic leaves; filaments very short, broad ..... 4. **Brachylepis.**
- Glands present between the stamens:—
  - Corolla-lobes valvate in bud ..... 5. **Decalepis.**
  - Corolla-lobes imbricate in bud ..... 6. **Streptocaulon.**

Pollen-masses 4 or 2, minute, waxy, sessile on a minute, soft pollen-carrier (Tribe II. SECAMONEAE) :—

Corolla-lobes imbricate in bud :—

Corolla-lobes small, overlapping to right or left ; style-apex short, rounded, obtuse ; leaves small, narrow, linear .....7. **Secamone.**

Corolla-lobes elongate, overlapping to the left ; style-apex elongate, conical or clavate ; leaves broad .....8. **Toxocarpus.**

Corolla-lobes valvate in bud, villous within, of 2 forms ; style-apex with a broad top, produced above it ; leaves broad ....9. **Genianthus.**

Pollen-masses waxy, opaque, without pellucid margin, attached in pairs by caudicles to the dark-coloured horny pollen-carriers :—

Pollen-masses pendulous (Tribe III. CYNANCHEAE) :—

Stem erect ; corolla valvate in bud :—

Corona processes laterally compressed .....10. **Calotropis.**

Corona-processes hooded, with a protruding horn 11. **Asclepias.**

Stem twining ; corolla-lobes more or less overlapping in bud :—

Corona single :—

Flowers large : -

Corolla thin, with a pubescent ring at its base ; corona-processes dilated at base, acuminate at tip ; follicles slender 12. **Oxystelma.**

Corolla thick, glabrous ; corona annular, fleshy 13. **Holostemma.**

Flowers small ; corolla rotate or campanulate :—

Corona of 5 erect laterally compressed processes with an upcurved spur at base.....14. **Pentatropis.**

Corona annular or tubular, plicate, toothed or lobed 15. **Cynanchum.**

Corona double, the outer membranous, annular or cupular, the inner of processes attached to the staminal column :—

Leafy twiners ; follicles softly echinate .....16. **Pergularia.**

Leafless fleshy stragglers ; follicles smooth ..17. **Sarcostemma.**

Pollen-masses erect or horizontal, very rarely pendulous (Tribe IV. MARSDENIEAE) :—

Corona single, corolline .....18. **Gymnema.**

Corona-processes adnate to the staminal column :—

Corolla-tubes overlapping :—

Corona of 5 distinct processes :—

Corona-lobes tubercle-like, radiating frm the base of the staminal column and quite adnate to it ; pollen-masses usually horizontal .....19. **Tylophora.**

Corona-lobes with the base adnate to the staminal column, free above; pollen-masses erect :—

Corona-lobes with a subulate process on the inner face 20. **Telosma.**

Corona-lobes without a process on the inner face 21. **Marsdenia.**

Corona-lobes scale-like, bifid at apex; style-apex with a rim ..... 22. **Cosmostigma.**

Corolla-tubes valvate :—

Corolla urceolate or disciform; corona cupular, fleshy, usually with an inner process ..... 23. **Oianthus.**

Corolla rotate :—

Leaves thin; corona spreading, usually with an inner process ..... 24. **Heterostemma.**

Leaves thick and fleshy; corona large, stellate .. 25. **Hoya.**

Pollen masses waxy, pellucid on one margin or at apex, attached in **pairs by** caudicles to the usually dark-coloured pollen-carriers; corolla-**lobes valvate** (Tribe V. CEROPEGIEAE) :—

Corona double; corolline of processes in the sinuses of the lobes, **staminal** annular ..... 26. **Leptadenia.**

Corona staminal, annular, single or double, usually with 5 processes **which** overlap the anthers :—

Leafy herbs with terete stems and branches :—

Corolla-tube campanulate-rotate, with narrow lobes; corona **single**, stamina', annular; slender plants with linear leaves. 27. **Brachystelma.**

Corolla-tube long, the lobes usually cohering at tip; corona **double**, staminal, outer annular, inner of incurved or erect processes; erect or twining herbs ..... 28. **Ceropegia.**

Leafless herbs with fleshy 4-angled stems and branches; corona **double**, the outer annular, the inner of inflexed processes. 29. **Caralluma.**

1. Hemidesmus, R. Br.

Twining undershrub. *Leaves* opposite or in whorls of 4. *Flowers* small, greenish-purple, in axillary opposite crowded subsessile cymes. *Calyx* 5-partite; lobes acuminate, with 5 minute scales at their bases within. *Corolla* rotate, deeply 5-fid, with valvate fleshy lobes; corona-scales 5, thick, on the corolla-lobes and alternate with them. *Stamens* inserted at the base of the corolla-tube; filaments distinct or subconnate at the base;

anthers small, cohering at the apex, ending in inflexed appendages; pollen-masses cohering in pairs in each cell, granular, the caudicles of the pollen-carriers bearing cucullate or spreading appendicles. *Ovary* of 2 many-ovuled carpels; styles distinct, style-apex 5-lobed, flat on top. *Fruit* of 2 slender divaricate terete follicular mericarps. *Seeds* oblong, flattened, ridged ventrally, ending in a long white silky coma; cotyledons oblong; radicle cylindric.

HEMIDESMUS INDICUS, R. Br.; F. B. I. iv. 4; W. & A. Contrib. 63; Wt. Ic. t. 594.

All plains Districts, in open forests, waste places and hedges, common.

A much-twining wiry shrub with polymorphous leaves varying from elliptic or almost orbicular and obtuse to long linear and narrow. The follicles are long and slender often up to 8 in. in length. Vern. *Tam.* Nannari; *Tel.* Sugandapala.

Var. *pubescens*, Hook f. *H. pubescens*, W. & A. Contrib. 63; Wt. Ic. t. 1320.

Branchlets, leaves beneath and inflorescence pubescent, the leaves variable as in the species.

N. Circars, Deccan and Carnatic from Vizagapatam to Madras.

2. Cryptolepis, R. Br.

Twining glabrous shrubs. *Leaves* opposite. *Flowers* in lax, slender, dichotomous, few-flowered, peduncled, terminal or axillary cymes; bracts and bracteoles small. *Calyx* deeply 5-fid with 5 scales within near the base. *Corolla*-tube short, cylindric or campanulate; lobes 5 linear, overlapping and twisted to the right in bud; corona-scales 5, linear or clavate, inserted near or above the middle of the tube. *Stamens* 5, attached near the base of the corolla-tube; filaments subconnate by broad bases; anthers short, adhering to the style-apex by their bases, the tips acuminate, connivent; pollen-masses cohering in pairs in each cell, granular, appendicles of pollen-carriers oblong. *Ovary* of 2 many-ovuled carpels; styles distinct, style-apex shortly conical. *Fruit* of 2 divaricate, smooth, follicular mericarps. *Seeds* oblong, flattened, ending in a long white silky coma; cotyledons elliptic; radicle long.

Main nerves of the leaves many, nearly horizontal and parallel, meeting in an intra-marginal ring, the leaves elliptic or elliptic-oblong with an abrupt apiculus, up to 7 in. long, and even 4 in. broad; peduncles very short, corolla-lobes ·3 in. long; follicles stout, 2–4 in. long, lanceolate ..... 1. *Buchanani.*

Main nerves of the leaves not horizontal and parallel, usually curved upwards; peduncles long; follicles long and narrow:—

Leaves ovate, obtuse or acute and apiculate, up to 4 in. long, 1·5 in. broad, main nerves about 5–6 pairs; peduncles 1·5 in. long; corolla-lobes ·4–·6 in. long; follicles linear lanceolate, ·4 in. long, ·3–·5 in. broad ..... 2. *grandiflora.*

Leaves oblong or oblong-lanceolate, apiculate, obtuse or even cordate at base, up to 3 in. long, 1–1·5 in. broad, main nerves about 7 pairs; peduncles 1 in. long; corolla-lobes ·4 in. long; follicles very slender, up to 8 in. long, ·2 in. broad ..... 3. *elegans.*

1. CRYPTOLEPIS BUCHANANI, Roem. & Sch., F. B. I. iv. 5; Wt. Ic. t. 494.

   N. Circars, Deccan, Carnatic and W. Coast, in deciduous forests and in hedges.

   A large much-branched climber with white flowers and leaves nearly white beneath. Bark purplish-red, peeling off in papery flakes; wood white. Vern. *Hind.* Karanta, *Tel.* Adivi pala tiga.

2. CRYPTOLEPIS GRANDIFLORA, Wt. Ic. t. 831; F. B. I. iv. 5.

   Deccan, forests of the Ceded Districts; hills of the Carnatic, south to Tinnevelly.

   A slender climber with rather large flowers, narrow divaricate follicles and rather thick leaves, the reticulation impressed above.

3. CRYPTOLEPIS ELEGANS, Wall.; F. B. I. iv 6. *C. pauciflora,* Wt. Ic. t. 493.

   N. Circars, hills of Ganjam to Godavari (A. W. Lushington, Barber, etc.).

   A slender wiry climber with thin leaves, yellow flowers and very narrow follicles often divaricate to lie in one straight line.

3. Utleria, Bedd.

A glabrous shrub. *Leaves* opposite, whorled or scattered, linear-lanceolate, subcrenulate, clustered at the ends of the thick branchlets. *Flowers* small, in terminal or axillary, long-peduncled,

glabrous, dichotomous cymes, among the leaves at the ends of the branchlets. *Calyx* very small; lobes 5, ovate, each with 2 minute glands. *Corolla* rotate; lobes 5, slightly overlapping and twisted to the right; corona-scales 5, small, rounded. *Stamens* inserted on the base of the corolla-tube; filaments short; anthers ovate, tip pointed, connivent over and adherent to the style-apex; pollen-masses in pairs in each cell, granular, the appendicles of the pollen-carriers short, rounded. *Ovary* of 2 many-ovuled carpels; style-apex convex on the top. *Fruit* of 2 smooth lanceolate divaricate follicular mericarps. *Seeds* broadly ovate, thin, tipped with a white coma.

UTLERIA SALICIFOLIA, Bedd.; F. B. I. iv. 7; Hook. Ic. t. 1432.
W. Ghâts, Anamalai Hills, at 3,000–5,000 ft. (Beddome, Fischer).

A shrub, up to 4·5 ft. high, growing among or in fissures of the rocks (Fischer), on open rocky ground, a small tree (Bedd.). Bark thick, grey, papery; wood white. The leaves are narrowly lanceolate, usually 3–4 in., sometimes up to 9 in. long, the mericarps 2 in. long, glabrous. Vern. *Kader* Utleer (Bedd.).

4. Brachylepis, W. & A.

A climbing shrub with pubescent branches and villous inflorescence. *Leaves* opposite. *Flowers* small, in terminal or axillary dichotomous bracteate cymes. *Calyx* deeply 5-fid, with 5 small glands between the ovate lobes within. *Corolla* rotate, 5-lobed, the lobes slightly overlapping to the right; corona of five broad membranous scales. *Stamens* inserted on the throat of the corolla, with very short broad filaments; anthers attached to the style-apex and inflexed to enclose it; pollen-masses in pairs in each cell, granular, the appendicles of the pollen-carriers minute, funnel-shaped. *Ovary* of 2 many-ovuled carpels; style-apex flat on the top. *Fruit* of 2 divaricate, acuminate, thick, smooth, follicular mericarps. *Seeds* ovate oblong, ridged ventrally, tipped with a long white coma, cotyledons elliptic, flat, radicle cylindric.

BRACHYLEPIS NERVOSA, W. & A. Contrib. 64; F. B. I. iv. 7; Wt. Ic. t. 1284, Spic. Neilgh. t. 156.
W. Ghâts. Nilgiri Hills at 5,000–7,500 ft.

A wiry climber, the corolla green without purple within, the leaves thick, elliptic, acute or acuminate, with 8–10 pairs

of strong main nerves, the follicles narrow-lanceolate about 3 in. long, divaricate in a nearly straight line.

5. Decalepis, W. & A.

A glabrous twining shrub, the branches jointed. *Leaves* opposite. *Flowers* small, in axillary peduncled cymes. *Calyx* deeply 5-fid, eglandular. *Corolla* rotate; lobes 5, valvate, white-villous within; corona of 10 scales, alternately long and hooded and short triangular flat. *Stamens* at the base of the corolla, alternating with triangular glands; filaments distinct but cohering at the base with the glands between; anthers ovate, conniving over and adnate to the style-apex, the tips acute, inflexed; pollen-masses granular, in pairs, appendicles of pollen-carriers shovel-shaped. *Ovary* of 2 many-ovuled carpels; styles distinct; style-apex convex, 5-grooved. *Fruit* of 2 thick lanceolate short follicular mericarps. *Seeds* shortly ovate, ridged, tipped with a white coma.

DECALEPIS HAMILTONII, W. & A. Contrib. 64; F B. I. iv. 11; Wt. Ic. t. 1285.

Deccan, Horsleykonda, at 4,500 ft. (Gamble), Madanapalle in Chittoor at 3,000 ft., hills of N. Coimbatore (Fischer); Carnatic, Veligonda Hills of Nellore (Ramaswami), Kambakam Hills of Chingleput; W Ghâts, Anamalais (Wight, Barber).

A climber with orbicular or elliptic-obovate leaves, about 2 in. long, the main nerves about 6 pairs, arched; the follicles 2·5 in. long, ·75 in. in diam.

6. Streptocaulon, W. & A.

Twining herbs or shrubs, usually tomentose. *Leaves* opposite. *Flowers* small, in lax sessile or peduncled trichotomous cymes in one axil of a pair of leaves. *Calyx* minute, 5-lobed, glandular within. *Corolla* rotate; lobes ovate, slightly overlapping to the right; corona-scales 5, filiform, adnate to the backs of the filaments. *Stamens* inserted at the base of the corolla; filaments very short alternating with minute glands; anthers conniving over and adherent to the style apex; pollen-masses in pairs in each cell, granular; appendicles of pollen-carriers spathulate. *Ovary* of 2 distinct carpels; style-apex 5-angled, convex at top.

Fruit of 2 divaricate follicular mericarps. *Seeds* flattened, keeled ventrally, tips with a long white silky coma; cotyledons oblong, flat; radicle long.

STREPTOCAULON KLEINII, W. & A. in Wt. Contrib. 65; F. B. I. iv. 9.

S. India, locality not known (Wight).

A climber with panduriform leaves rugose above and densely white tomentose beneath, the cymes with peduncles about 1 in. long, few-flowered.

7. Secamone, R. Br.

Climbing or straggling shrubs or undershrubs. *Leaves* opposite. ***Flowers*** small or minute, in lax axillary, sessile or shortly peduncled, 2–3-chotomous cymes. *Calyx* 5-lobed, eglandular. *Corolla* small, rotate, 5-lobed, the lobes overlapping to right or left; corona-scales 5, adnate to the staminal column, compressed. *Stamens* inserted at the base of the corolla; filaments short, free or connate at base; anther-tips inflexed and connivent round the style-apex; pollen-masses small, in pairs in each cell, attached in fours to a minute pollen-carrier without caudicles. *Ovary* of 2 carpels, many-ovuled; style columnar, dilated, ending in a flattened ring and produced above it. *Fruit* of 2 divaricate follicular mericarps, smooth. *Seeds* oblong, flattened but ridged, ending in a long white silky coma; cotyledons linear-oblong; radicle nearly as long, cylindric.

SECAMONE EMETICA, R. Br.; F. B. I, iv. 13; Wt. Contrib. 60; Wt. Ic. t. 1283.

Deccan and Carnatic, in hilly regions from Nellore to Coimbatore, south to Tinnevelly, up to 4,500 ft. on Horsleykonda.

A wiry much-branched climbing shrub with minute flowers, narrow linear leaves, and slender follicles about 2–2·5 in. long. Bark brown, thick, corky and deeply-cleft; wood white.

8. Toxocarpus, W. & A. in part.

Twining shrubs. *Leaves* opposite. *Flowers* small or moderate-sized, in axillary dichotomous paniculate or racemose cymes. *Calyx* very small, 5-lobed, with or without minute scales at the base within. *Corolla*-tube short, usually campanulate, 5-lobed, the lobes linear-oblong, overlapping to the left; corona-scales attached to the staminal tube, flattened, sometimes with an inner

flap. *Stamens* inserted at the base of the corolla; filaments connate; anthers small, minutely fimbriate at tip; pollen-masses very minute, pendulous, apparently in pairs attached to minute soft pollen-carriers, without caudicles. *Ovary* of 2 carpels; style slender, style-apex long and slender or clavate. *Fruit* of 2 divaricate follicular mericarps. *Seeds* oblong, flattened, tipped with a silky coma; cotyledons oblong; radicle cylindric.

Corona-scales shorter than the stamens, acute :—

Corolla ·2 in. long; leaves ovate, abruptly acute, thin, glabrous, up to 3 in. long, 2 in. broad, main nerves about 5 pairs . . 1. *Roxburghii.*

Corolla ·4 in. long; leaves elliptic or elliptic-obovate, abruptly acuminate, nearly glabrous, up to 4·5 in. long, 2 in. broad, main nerves 6–7 pairs . . . . . 2. *palghatensis.*

Corona-scales longer than the stamens, obtuse :—

Corolla ·35 in. long, the tube short, villous within; leaves lanceolate or elliptic-lanceolate, acuminate, cuneate at base, glabrous, 4 in. long, 1·5 in. broad, the main nerves 7 pairs . . . . . 3. *Beddomei.*

Corolla ·5 in. long, the tube short, glabrous within; leaves ovate, acuminate, rounded at base, usually glandular-pubescent beneath, up to 3 in. long, 1·5 in. broad, main nerves 4–5 pairs; follicles very slender, acuminate, 6 in. long . . . . . 4. *Kleinii.*

1. TOXOCARPUS ROXBURGHII, W. & A. in Wt. Contrib. 61; F. B. I. iv. 14; Wt. Ic. t. 475.

   V. Circars ? (Heyne).

   A slender climber with pale yellow fragrant flowers (Roxb.).

2. TOXOCARPUS PALGHATENSIS, Gamble in Kew Bull. 1922, 119.

   W. Ghâts, Palghat Hills of Malabar at 3,500 ft. (Beddome).

   A slender climber with smooth leaves and much nearly black furfuraceous tomentum on the younger parts.

3. TOXOCARPUS BEDDOMEI, Gamble in Kew Bull. 1922, 119.

   W. Ghâts, Atraimalai Hills of Tinnevelly (Beddome).

   A slender climber, the leaves smooth and pale when dry.

4. TOXOCARPUS KLEINII, W. & A. Contrib. 61; F. B. I. iv. 14; Wt. Ic. t. 886.

   N. Circars, on the Godavari (Barber); Carnatic, hills of Trichinopoly; W. Ghâts, Nilgiris, hills of Cochin.

   A slender climbing shrub, the stem, inflorescence and under-surface of leaves rufous-villous, the follicles curved and long-beaked.

9. Genianthus, Hook. f.

Twining shrubs. *Leaves* opposite. *Flowers* small, in axillary usually di- or tri-chotomous cymes. *Calyx* very small, 5-lobed, with minute scales at the base within. *Corolla* rotate; tube short; lobes spreading or recurved, villous within, valvate in bud; corona-scales 5, flattened, attached to the staminal tube. *Stamens* in a column, the anthers erect, appendages short; pollen-masses 2 in each cell, granular, on a small pollen-carrier, without caudicles. *Ovary* of 2 carpels; style with a broad apex, usually produced above it. *Fruit* of 2 follicular mericarps, slender and usually curved. *Seeds* flattened, with a long silky coma.

GENIANTHUS LAURIFOLIUS, Hook. f.; F. B. I. iv. 16. *Toxocarpus laurifolius*, Wt.; W. & A. Contrib. 61; Wt. Ic. t. 598.

S. Canara, at Jahlsur (Barber).

A slender climbing shrub with broadly elliptic, shortly acuminate leaves with 6–7 pairs of curved main nerves, flowers of 2 forms, one with short recurved densely bearded corolla-lobes, the others with broader erect pubescent ones, the latter apparently the fertile ones, and terete slender follicles 3–5 in. long.

10. Calotropis, R. Br.

Large erect shrubs or small trees. *Leaves* opposite, broad. *Flowers* medium-sized, in umbellate or racemose lateral pedunculate cymes. *Calyx* 5-lobed; lobes broadly ovate, glandular within. *Corolla* broadly campanulate or subrotate, divided more than halfway down in 5 valvate lobes; corona scales 5, fleshy, adnate to and radiating from the large staminal column, with an upcurved involute spur or two obtuse auricles. *Stamens* inserted at the base of the corolla; anthers short, broad, somewhat horny at the angled wings; appendages short, broad, inflexed over the style-apex; anther-cells a shallow pouch; pollen-masses solitary, flattened, pendulous, attached by slender caudicles to the oblong pollen-carriers. *Ovary* of 2 distinct carpels; style slender with a depressed pentagonal style-apex. *Fruit* of 2 large, inflated, fleshy, thick follicular mericarps. *Seeds* ovate, plano-convex, the broad apex surmounted by a coma of long slender silky hairs.

Corolla-lobes spreading, pale lavender; corona-scales narrow, shorter than the staminal column, with pubescent back, the entire apex with 2 obtuse auricles below it, the spur upcurved involute..... 1. *gigantea*.

Corolla-lobes erect, pink and purple spotted; corona-scales, equal to or longer than the staminal column, glabrous on the back, the apex bifid without auricles, the spur upcurved acute ....,....2. *procera*.

1. CALOTROPIS GIGANTEA, R. Br.; F. B. I. iv. 17; W. & A. Contrib. 53.

   All plains Districts in waste places and on roadsides, often on black cotton soil.

   A large milky shrub, very pale in colour, the branches and leaves and inflorescence covered with loose soft white wool, the large sessile leaves ovate or obovate, cordate at base, the flowers large and pale, the large fleshy follicles green and ventricose, the seeds with an abundant white milky coma. Bark yellowish-white; wood white and soft. The bark gives a strong fibre and the silky coma is used to stuff pillows. Vern. *Hind.* Mudár, Ak.; *Ur.* Uruk; *Tel.* Jilledu; *Tam.* Erukku, Yerikan; *Mal.* Yerikku.

2. CALOTROPIS PROCERA, R. Br.; F. B. I. iv. 18; Wt. Ic. t. 1278.

   Most plains Districts, as the preceding, usually in drier localities.

   A milky shrub, smaller in size than the preceding and like it except as regards the flowers. The uses are the same. Vern. *Hind.* Mudár, Ak.; *Tel.* Jelledu.

11. Asclepias, Linn.

Perennial herbs or shrubs, often with tuberous roots. *Leaves* opposite or whorled. *Flowers* moderate-sized, in umbellate cymes. *Calyx* deeply 5-partite, 5–10-glandular within at the base. *Corolla* ate, deeply 5-lobed; lobes valvate or slightly overlapping, often tured; corona-scales 5, arising from the staminal column and adnate to it above, concave-cucullate with sometimes a horn protruding from within. *Stamens* adnate near the base of the corolla, the filaments connate in a tube; anthers with a membranous tip over the style-apex; pollen-masses pendulous, flattened, solitary, attached by often curved caudicles to the hard pollen-carriers. *Ovary* of 2 distinct carpels; styles free below, connected above; style-apex columnar, truncate or depressed at tip. *Fruit* of 2 smooth usually beaked and inflated follicular mericarps, often more or less covered with subulate hairs. *Seeds* flattened, winged, ending in a silky coma; cotyledons elliptic, radicle as long.

ASCLEPIAS CURASSAVICA, Linn.; F. B. I. iv. 18.

Most plains Districts, in waste places and on roadsides; a tropical American plant, run wild and now common; often planted in gardens.

An erect herb with narrowly lanceolate leaves, bright orange-red flowers and beaked and stalked follicles about 3 in. long.

A. physocarpa, Schlect., is a shrubby plant found in gardens and sometimes run wild in the Nilgiri Hills. The large, usually obtuse, inflated follicles have sparse long setae on their sides.

12. Oxystelma, R. Br.

Glabrous twining herbs or undershrubs. *Leaves* opposite, narrow. *Flowers* large, in lax racemose or subumbellate cymes or solitary; pedicels filiform. *Calyx* small, 5-partite, with a row of glands at the base within. *Corolla* broadly rotate, lobed halfway down and with a densely pubescent ring (corolline corona of some authors) at its base; lobes triangular, ciliate, valvate at base, shortly overlapping to the right in bud; corona-processes adnate to the staminal tube, the bases dilated, the tips acuminate. *Stamens* with the filaments connate in a tube; anthers erect, with a short membranous inflexed appendage; pollen-masses waxy, pendulous, elongate-clavate, attached in pairs by slender caudicles to the hard brown shortly oblong pollen-carriers. *Ovary* of 2 many-ovuled carpels; style short, the apex truncate or convex. *Fruit* of 2 (1 usually absent) rather short, smooth or winged follicular mericarps. *Seeds* small, ovoid, winged on the margins, ending in a silky coma; cotyledons suborbicular; radicle short.

OXYSTELMA ESCULENTUM, R. Br.; W. & A. Contrib. 54; F. B. I. iv. 17. *Periploca esculenta*, Roxb. Cor. Pl. t. 11.

N. Circars and Carnatic, in hedges and among bushes, usually near water; less common in the Deccan, common in S. Travancore along water-courses.

A very pretty graceful twining herb with narrow linear-lanceolate leaves, widely open flowers with a white or rose corolla marked with purple veins, and lanceolate acuminate follicles rounded at base and winged. Vern. *Hind.* Kirni, Dudhi; *Tel.* Dudhi pala.

13. Holostemma, R. Br

Glabrous twining shrubs. *Leaves* opposite, cordate. *Flowers* large, purple, in few-flowered axillary cymes. *Calyx* 5-partite, eglandular. *Corolla* thick, subrotate, deeply 5-lobed, the lobes overlapping to the right; corona affixed to the base of the staminal column, annular, fleshy, truncate. *Stamens* adnate to the base of the corolla-tube, the filaments connate in a 10-winged column; anthers large, horny, shining, with membranous inflexed tips; pollen-masses pendulous, clavate, elongate, compressed, attached by long caudicles to the hard brown linear pollen-carriers. *Ovary* of 2 distinct carpels; style slender, style-apex oblong, 5-winged. *Fruit* of 1–2 thick lanceolate broad follicles. *Seeds* ovoid, flattened, winged, ending in a white silky coma.

HOLOSTEMMA ANNULARE, K. Schum.; *H. Rheedii*, Wall.; F. B. I. iv. 21; Wt. Contrib. 55, Ic. t. 597.

N. Circars, Deccan and Carnatic, in hedges and in open forests, especially in the hills, westwards to the lower slopes of the Ghâts; coast of S. Travancore.

A large climber with large conspicuous flowers, the corolla purple within, pink or white without, ovate deeply cordate acuminate leaves and a thick follicle 3·5 in. long, the second one often suppressed.

14. Pentatropis, R. Br.

Slender twining herbs or undershrubs. *Leaves* opposite, small. *Flowers* small, purplish, in lateral or axillary umbellate cymes; pedicels filiform. *Calyx* 5-partite, usually glandular within; lobes acute. *Corolla* rotate, divided nearly to the base; lobes elongate, overlapping to the right, twisted to the left; corona of 5 laterally compressed scales adnate to the backs of the anthers and with an upcurved spur at the base. *Stamens* 5, in a short column from the base of the corolla; anthers with membranous tips; pollen-masses pendulous, not compressed, waxy, attached by short caudicles to the oblong pollen-carriers. *Ovary* of 2 distinct carpels, many-ovuled; style slender, style-apex 5-angled, shortly cylindric, tip flat. *Fruit* of 2 lanceolate, beaked, follicular mericarps. *Seeds* ovoid, flattened, margined, ending in a white silky coma.

PENTATROPIS MICROPHYLLA, W. & A. in Wt. Contrib. 52; F. B. I. iv. 19; Wt. Ic. t. 352.

Deccan and Carnatic, in hedges and open forest land.

A very slender climber with small purplish corollas pubescent within, small ovate obtuse mucronate leaves and beaked follicles about 2·5 in. long.

15. Cynanchum, Linn.

Erect or twining herbs or shrubs. *Leaves* opposite, often with a second pair, stipule-like and smaller, alternating from the same node. *Flowers* small, greenish or purplish, in axillary, umbellate or corymbose, sessile or peduncled cymes. *Calyx* 5-partite, usually with glands at the base within. *Corolla* rotate or campanulate, 5-partite, the lobes slightly overlapping to the right in bud; corona membranous, adnate to the base of the staminal column, annular cupular or tubular, toothed or lobed at the top. *Stamens* 5, adnate to the base of the corolla-tube; filaments connate in a short column, anthers hardened, the appendages membranous, erect or inflexed; pollen-masses oblong, pendulous, attached by short caudicles to the horny pollen-carriers. *Ovary* of 2 carpels; styles free below; style-apex 5-angled, truncate rounded or conical. *Fruit* of 2 smooth follicular mericarps, often winged. *Seeds* plano-convex, margined, ending in a silky coma; cotyledons ovate; radicle nearly as long.

Follicles not winged, long-beaked; leaves broadly cordate at base with a deep open sinus, the basal lobes rounded, otherwise ovate, acute or acuminate, up to 3 in. long, 2 in. broad; stipular leaflets rounded; corolla-lobes narrowly lanceolate, ·1 in. long, spreading; corona tubular, plicate, with 5 lanceolate lobes and small teeth between them

1. *pauciflorum.*

Follicles winged, acute or acuminate:—

Leaves very shortly cordate at base with small rounded, sometimes overlapping lobes and small sinus, otherwise linear or elliptic- or ovate-oblong, apiculate, glaucous beneath, up to 4 in. long, 1·5 or even 2 in. broad; stipular leaves small, often wanting; corolla-lobes erect or spreading, oblong, ·15 in. long; corona tubular, plicate, with 5 entire or toothed lobes with teeth between them . . . . 2. *Callialata.*

Leaves truncate or shortly cordate at base, the lobes if cordate rounded with a shallow sinus, otherwise variable in shape, ovate or lanceolate, acuminate, pale but not glaucous beneath, up to 3 in. long, 1·5 or

even 2 in. broad, the stipular leaves ovate apiculate; corolla-lobes reflexed ovate-oblong, ·15 in. long; corona short, cupular, plicate, irregularly crenately lobed .....3. *alatum.*

1. CYNANCHUM PAUCIFLORUM, R. Br.; F. B. I. iv. 23; Wt. Contrib. 56, Ic. t. 354.

   Carnatic and the Eastern slopes of the W. Ghâts from the Pulneys southwards.

   A herbaceous climber, glabrous, the flowers greenish tinged with pink.

2. CYNANCHUM CALLIALATA, Ham. in Wt. Contrib. 56; F. B. I. iv. 24; Wt. Ic. t. 1279.

   N. Circars, hills of Ganjam and Vizagapatam; W. Ghâts, in all Districts on W. side, up to 3,000 ft.; Shevaroy Hills of Salem (Bourne).

   A herbaceous twining shrub, glabrous. The Circar specimens have mostly narrow leaves, and agree with *C. angustifolium*, W. & A. in Wt. Contrib. 57, which is hardly even a variety.

3. CYNANCHUM ALATUM, W. & A.; Wt. Contrib., 57. Ic. t. 1250 (but not so hairy); F. B. I. iv. 23.

   W. Ghâts, Nilgiris, Pulneys, Anamalais and hills of Tinnevelly and Travancore up to 6,000 ft.

   A slender twiner, branchlets and young leaves slightly pubescent.

16. Pergularia, Linn (not of other authors).

Twining pubescent or tomentose undershrubs. *Leaves* opposite, cordate. *Flowers* medium-sized, greenish-white, in axillary racemose or corymbose pedunculate cymes; pedicels slender. *Calyx* 5-partite, 5-glandular, lobes acute. *Corolla*-tube short, campanulate or funnel-shaped; lobes 5, ovate, spreading, overlapping to the right in bud; corona double, the outer membranous, annular, 5-lobed, the lobes truncate or dentate, the inner of 5 erect, laterally compressed, lobes spurred at the base and produced above in long free often fimbriate tips curved over the style-apex. *Stamens* 5, adnate to the corolla-tube; filaments connate in a column; anther-appendages membranous, inflexed; pollen-masses waxy, pendulous, attached in pairs to the shining horny pollen-carriers without caudicles. *Ovary* of 2 distinct

carpels; styles slender; style-apex slightly convex at top. *Fruit* of 2 lanceolate, acuminate, smooth or softly echinate, often recurved follicles. *Seeds* ovate, minutely pubescent, margined, ending in a silky white coma; cotyledons suborbicular, radicle pointed.

PERGULARIA EXTENSA, N. E. Br. in Fl. Cap. iv. i. 758. *Daemia extensa*, R. Br.; F. B. I. iv. 20; Wt. Contrib. 59, Ic. t. 596.

N. Circars, Deccan and Carnatic, westwards to the E. slopes of the W. Ghâts up to 3,000 ft., common.

A slender bad-smelling milky climber with hispid stems, greenish flowers, suborbicular cordate leaves and reflexed lanceolate follicles covered with soft spines. Vern. *Tam.* Belaparti.

17. Sarcostemma, R. Br.

Shrubs, with trailing leafless jointed stems and pendulous branches. *Flowers* small, in sessile terminal or lateral umbels. *Calyx* small, 5-partite, glandular or not within. *Corolla* rotate, deeply lobed; lobes 5, overlapping to the right in bud; corona double, the outer cupular, membranous, 5–10-lobed or -crenate, attached to the base of the staminal column, the inner of 5 erect fleshy compressed or rounded processes adnate to the stamens above and more or less to the outer corona below, rarely absent. *Stamens* adnate to the base of the corolla-tube; filaments forming a column; anthers with membranous inflexed appendages; pollen-masses slender, curved, pendulous, attached by usually short caudicles to the hard pollen-carriers. *Ovary* of 2 carpels; styles slender; style-apex 5-angled, rounded or conical or fusiform at top. *Fruit* of 2 straight smooth follicular mericarps. *Seeds* flat, usually margined, the margins sometimes toothed at base; cotyledons fleshy, elliptic or oblong; radicle short or long.

Umbels always terminal, pedicels glabrous or slightly pubescent; inner corona longer than the anthers; follicles ·5 in. long or less, slightly divaricate; seeds small, ·25 in. long or less, the wings usually toothed below, radicle as long as the cotyledons:—

Style-apex rounded at top; follicles lanceolate, 4–5 in. long; seeds glabrous ..... 1. *brevistigma.*

Style-apex acuminate at top; follicles linear, 2·5–4 in. long; seeds pubescent ..... 2. *intermedium.*

Umbels usually lateral, pedicels crispate villous; inner corona shorter than the anthers; follicles up to 9 in. long, recurved; seeds large, ·3–·4 in. long, glabrous, broadly margined and not toothed, radicle very short, the cotyledons long .....3. *Brunonianum.*

1. SARCOSTEMMA BREVISTIGMA, W. & A. in Wt. Contrib. 59; F. B. I. iv. 26; Wt. Ic. t. 595.

   N. Circars, Deccan and Carnatic, in stony places chiefly, up to 4,500 ft. on Horsleykonda.

   A jointed shrub trailing over bushes and rocks, the succulent stems up to ·25 in. in diam. Vern. *Hind.* Soma.

2. SARCOSTEMMA INTERMEDIUM, Dcne; F. B. I. iv. 27. *S. viminale*, Wt. Contrib. 59, Ic. t. 1281, *not of* R. Br.

   W. Deccan and Carnatic, Coimbatore to Tinnevelly, in dry places.

   A jointed shrub, similar to the last but rarer.

3. SARCOSTEMMA BRUNONIANUM, W. & A. in Wt. Contrib. 59; F. B. I. iv. 27; Wt. Ic. t. 1282; Bot. Mag. t. 6002.

   W. Deccan, Coimbatore to the lower slopes of the Nilgiris and Pulneys, in dry forest lands.

   A slender trailing plant with large follicles and seeds, the flowers white or yellow (Bot. Mag.)

18. Gymnema, R. Br.

Twining shrubs or undershrubs. *Leaves* opposite. *Flowers* small, in crowded axillary or lateral umbellate cymes. *Calyx* 5-partite, with or without glands within at the base. *Corolla* subrotate campanulate or urceolate; lobes subvalvate or narrowly overlapping to the right; corona 0 or of fleshy processes adnate to the tube and sometimes produced beyond it between the lobes. *Staminal-column* arising from the base of the corolla; anthers erect with short membranous appendages; pollen-masses erect, attached to the horny pollen-carriers by very short caudicles. *Ovary* of 2 carpels; styles free to near the top; style-apex large, conical clavate or capitate, exserted beyond the anthers. *Fruit* of 2 (or 1) smooth follicular mericarps. *Seeds* ovate, margined, ending in a silky coma; cotyledons elliptic; radicle cylindric.

Flowers very small; calyx-lobes short, ovate; corona of 5 fleshy processes exserted in the sinuses of the lobes and decurrent in villous ridges on the tube:—

Corolla ·1 in long; corona ridges long, the apical processes small; leaves thin, ovate elliptic or almost lanceolate, acute or shortly acuminate at apex, cuneate rounded or sometimes cordate at base, pubescent or subglabrous, up to 2·5 in. long, 1·5 in. broad; follicles slender, up to 3 in. long; seeds ·4 in. long, broadly margined .....1. *sylvestre.*

Corolla ·15 in. long; corona ridges short, the apical processes large and thick; leaves thick, ovate, often broadly, acute at apex, rounded or cordate at base, densely rusty tomentose, up to 3 in. long, 2 in. broad; follicles slender, up to 2·5 in. long; seeds ·3–·35 in. long, narrowly margined .....2. *hirsutum.*

Flowers larger; calyx-lobes linear-oblong; corona of villous ridges on the tube, but without fleshy processes in the sinuses of the lobes :—

Leaves membranous when dry, nearly glabrous, more or less ovate, acuminate at apex and cordate at base :—

Leaves broadly ovate or elliptic-ovate, abruptly acuminate, the base rounded or cordate, up to 7 in. long, 2·5–4 in. broad; umbels many-flowered, pedicels slender, ·5 in. long; corolla ·3–·35 in. long .....3. *tingens.*

Leaves ovate, gradually acuminate, the base shallowly cordate, up to 4 in. long, 2–2·5 in. broad, the lowest two pairs of nerves from the base; umbels few-flowered, pedicels slender, ·2 in. long; corolla ·2 in. long .....4. *elegans.*

Leaves subcoriaceous, oblong or ovate-oblong or oblong-lanceolate, obtusely acuminate, rounded at base, 3–4 in. long, about 1 in. broad; umbels many-flowered, the rather stout pedicels ·3 in. long; corolla ·2–·3 in. long .....5. *montanum.*

1. GYMNEMA SYLVESTRE, R. Br.; F. B. I. iv. 29; Wt. Contrib. 44, Ic. t. 349.

N. Circars, Deccan and Carnatic, in dry forests, up to about 2,000 ft. in the hills.

A large climber with small yellowish flowers. The leaves of this and the next species have the curious property of neutralising the taste of sugar. Vern. *Mar.* Kavali.

2. GYMNEMA HIRSUTUM, W. & A. in Wt. Contrib. 44; F. B. I. iv. 29; Wt. Ic. t. 1272. *G. Decaisneanum*, Wt. Ic. t. 1271.

W. Ghâts, Nilgiris at 5,000–7,000 ft., common, hills of Travancore and Tinnevelly at rather lower levels; hills of N. Coimbatore.

A large climber with spirally twisted stems and yellow flowers. Bark rough, brown; wood white, of irregular structure

3. GYMNEMA TINGENS, W. & A. in Wt. Contrib. 45; F. B. I. iv. 31. *G. tingens* var. *cordifolia*, Wt. Ic. t. 593. *Asclepias tingens*, Roxb. Cor. Pl. t. 239.

W. Ghâts, Ânamalai Hills at 4,000 ft. (Beddome).

A gigantic climber (Beddome), with pale yellow flowers, the follicles (in N. India) up to 7 in. long and nearly 1 in. broad.

4. GYMNEMA ELEGANS, W. & A. in Wt. Contrib. 46; F. B. I. iv. 32; Wt. Ic. t. 830.

Hills of S. Carnatic, from Salem to Tinnevelly (*fide* Wight).

A rather slender climber with white flowers and lanceolate follicles 3 in. long, ·5 in. broad.

5. GYMNEMA MONTANUM, Hook. f.; F. B. I. iv. 31. *G. tingens* var. *ovalifolia*, Wt. Ic. t. 592 (not good).

W. Ghâts, Nilgiri and Anamalai Hills, at 4,000–7,000 ft.

A lovely creeper (Beddome) with pale yellow flowers and follicles 3 in. long and about ·25–·35 in. broad (Cooke).

19. Tylophora, R. Br.

Erect or twining perennial herbs or undershrubs. *Leaves* opposite. *Flowers* small, in axillary or lateral simple or branched umbelliform cymes of flower-clusters or short racemes scattered along them. *Calyx* 5-partite, glandular within; lobes ovate or lanceolate. *Corolla* rotate or rotate-campanulate, deeply 5-lobed, the lobes slightly overlapping to the right; corona of 5 small fleshy tubercular processes adnate to the lower part of the staminal-column. *Staminal-column* arising from the base of the corolla; anthers erect, small, with small inflexed membranous appendages; pollen-masses minute, usually horizontal, attached by their middle or near their base by very slender usually short caudicles to the pollen-carriers. *Ovary* of 2 carpels; style-apex pentagonal or 5-lobed, flattened or convex, rarely exserted. *Fruit* of 2 (or, by abortion, 1) follicular mericarps, smooth, usually acuminate. *Seeds* flattened, ovoid, margined, ending in a silky coma; cotyledons elliptic; radicle cylindric.

Stems erect or suberect, sometimes more or less climbing in the branchlets :—

Pollen-carriers very minute, caudicles short; anther-appendages inconspicuous; leaves ovate or lanceolate, long-petioled, up to 2 in. long, 1 in. broad :—

Corolla-lobes very small, ·05 in. long, lanceolate; corona-processes globose ..... 1. *fasciculata.*

Corolla-lobes ovate-lanceolate, acuminate, ·15 in. long; corona processes ovoid, pointed ..... 2. *macrantha.*

Pollen-carriers elongate, narrow, caudicles long and very slender; corona-processes ovoid, obtusely acute, shorter than the conspicuously appendaged anthers; leaves ovate or lanceolate, acuminate, up to 2·5 in. long, 1·5 in. broad ..... 3. *Iphisia.*

Stems always long and climbing:—

Stems, leaves and inflorescence glabrous; corona-processes subglobose, not pointed:—

Cymes elongate, divaricate, many-branched, up to 6 in. long and broad, corona-processes very minutely puberulous; leaves large, fleshy, elliptic or elliptic-ovate, apiculate, up to 6 in. long, 4 in. broad, the main nerves spreading, 7–8 pairs ..... 4. *zeylanica.*

Cymes short, sessile or peduncled, few-branched, usually umbellate; corona-processes glabrous:—

Leaves coriaceous, elliptic, elliptic-oblong or -lanceolate, acute or apiculate, with 5–6 pairs of prominent main nerves, up to 4 in. long, 1·5 in. broad; flowers very minute, in sessile or shortly peduncled umbels with capillary pedicels ..... 5. *capparidifolia.*

Leaves fleshy when fresh, chartaceous when dry, ovate-elliptic or -oblong or -lanceolate, acute or apiculate, the main nerves indistinct, up to 2·5 in. long, 1 in. broad, petiole short; flowers minute, in shortly peduncled few-flowered cymes with capillary pedicels ..... 6. *tenuis.*

Leaves membranous, triangular-ovate, acute or acuminate, the main nerves indistinct, up to 4 in. long, 2 in. broad, petiole long; flowers small, in rather long peduncled few-flowered cymes with capillary pedicels ..... 7. *pauciflora.*

Stems, leaves and inflorescence more or less pubescent:—

Corona-processes sub-globose, not pointed at apex; calyx-lobes hirsute:—

Stems trailing flat along the ground from a woody rootstock; leaves coriaceous, orbicular or broadly ovate, rounded or slightly acute, sometimes emarginate at apex, rounded or cordate at base, very shortly petioled, up to about 2·5 in. in diam.; flowers in many-flowered umbellate cymes, the long pedicels filiform 8. *rotundifolia.*

Stems climbing, not trailing on the ground, densely softly tomentose, also the leaves; leaves elliptic-oblong or ovate, acute or abruptly apiculate, rounded or sometimes cordate at base,

shortly petioled, up to 3 in. long, 2 in. broad, but usually narrower; flowers minute in elongate spikes, often 3 in. long, of small, distant umbels, the pedicels short and filiform. ..9. *mollissima.*

Corona-processes gibbous below, the apex with a free acuminate point; stems and leaves usually pubescent sometimes nearly or quite glabrous; leaves ovate or elliptic-oblong, acute or apiculate, rounded or cordate at base, up to 4 in. long, 2·25 in. broad; flowers rather large, in umbellate or racemose pedunculate cymes 10. *asthmatica.*

Corona-processes compressed, curved to an acuminate point; stems and leaves nearly glabrous, the leaves ovate cordate apiculate, about ·7 in. long, ·5 in. broad; flowers small, solitary, on capillary peduncles .....11. *cordifolia.*

1. TYLOPHORA FASCICULATA, Ham. in Wt. Contrib. 50; F. B. I. iv. 40; Wt. Ic. t. 848.

   N. Circars, Deccan and Carnatic, usually at low levels, among grass.

   A slender erect undershrub with thick fascicled roots, the upper branches often twining to some extent, the flowers minute with filiform pedicels. Follicles lanceolate, 1·5–2 in. long, ·5 in. broad, seeds orbicular.

2. TYLOPHORA MACRANTHA, Hook. f.; F. B. I. iv. 40.

   N. Circars, hills of Vizagapatam (Barber); Deccan, hilly country from Kurnool to N. Coimbatore; W. Ghâts, Nilgiris, Pulneys and hills of Tinnevelly, at 3,000–5,000 ft. in grass.

   A slender erect undershrub with thick fascicled roots, the upper branches twining more or less, similar to No. 1 but with larger flowers and thicker pedicels.

3. TYLOPHORA IPHISIA, Dene; F. B. I. iv. 40; Wt. Ic. t. 1276. *Iphisia multiflora*, W. & A. in Wt. Contrib. 52.

   W. Ghâts, Nilgiri Hills, at 6,000–7,000 ft.

   A somewhat stout undershrub, erect at first, then climbing, the flowers dark purple, the follicles lanceolate acuminate, flattened, up to 3·5 in. long, the seeds oblong.

4. TYLOPHORA ZEYLANICA, Dene; F. B. I. iv. 42.

   W. Ghâts, forests of Travancore, at 2,000 ft. (Beddome).

   A superb and very large creeper (Beddome) with deep purple flowers, the follicles slender, up to 6 in. long, the seeds oblong-obovate.

5. TYLOPHORA CAPPARIDIFOLIA, W. & A. in Wt. Contrib. 51; F. B. I. iv. 41.

   W. Ghâts, from the Nilgiris to the hills of Tinnevelly.

   A much twining undershrub, the follicles slenderly lanceolate and long beaked, up to 4 in. long.

6. TYLOPHORA TENUIS, Blume; F. B. I. iv. 42. *T. carnosa*, Wall.; Wt. Contrib. 49, Ic. t. 351. *T. tenuissima*, W. & A., in Wt. Contrib. 49, Ic. t. 588.

   W. Ghâts, Pulney Hills and hills of Tinnevelly, up to 7,000 ft.; W. Coast, along backwaters in Travancore.

   A slender twining undershrub, the follicles linear-lanceolate, 2–3 in. long.

7. TYLOPHORA PAUCIFLORA, W. & A. in Wt. Contrib. 49; F. B. I. iv. 41; Wt. Ic. t. 1274.

   Deccan, in S. Canara, Mysore and N. Coimbatore; W. Ghâts, Pulney Hills and hills of Travancore and Tinnevelly, up to about 3,000 ft.

   A small climber with pale branches, the flowers apparently purplish.

8. TYLOPHORA ROTUNDIFOLIA, Ham. in Wt. Contrib. 50; F. B. I. iv. 43.

   N. Circars, Ganjam to Godavari, especially in Sal forest undergrowth; W. Ghâts, Anamalais at 5,000 ft. (Beddome).

   A curious plant, the follicles broadly ovate-fusiform, hard, about 2 in. long, the seeds nearly orbicular.

9. TYLOPHORA MOLLISSIMA, Wt. Contrib. 49; F. B. I. iv. 43; Wt. Ic. t. 1275.

   W. Ghâts, Pulney and Sirumalai Hills of Madura, up to 7,000 ft.

   A slender climber, twining among bushes, the follicles narrowly lanceolate, 2–2·5 in. long, the seeds ovate-oblong with a rather short coma.

10. TYLOPHORA ASTHMATICA, W. & A. in Wt. Contrib. 51; F. B. I. iv. 44; Wt. Ic. t. 1277.

    All plains Districts, common in hedges and open forests, up to about 3,000 ft. in hilly country.

    A much-branching climber with long fleshy roots, variable leaves, greenish-yellow or greenish-purple flowers and lanceolate sharp-pointed follicles 3–4 in. long, the seeds

ovate. The roots and leaves have been used as a substitute for Ipecacuanha (see Roxb., etc.). Vern. *Hind.* Antamul; *Tel.* Kaka palla.

11. TYLOPHORA CORDIFOLIA, Thw.; F. B. I. iv. 44.

Travancore, at Shencotta (M. Rama Rao).

A very slender small-leaved twining plant with dark purple corolla and slender follicles.

20. Telosma, Coville.

Twining undershrubs. *Leaves* opposite, usually cordate, membranous. *Flowers* rather large, yellow or greenish, in axillary umbelliform cymes. *Calyx* 5-partite, minutely glandular within; lobes lanceolate. *Corolla* somewhat salver-shaped, the tube swollen below, sometimes constricted at the throat; lobes oblong or linear, overlapping to the right, spreading in flower; corona-processes adnate to the back of the staminal column, erect, free above and sometimes 2-lamellate. *Staminal-column* arising from near the base of the corolla-tube; anthers with membranous tips; pollen-masses erect, waxy, attached to the pollen-carriers by short caudicles. *Ovary* of 2 carpels, style short; style-apex umbonate or capitate. *Fruit* of 2 lanceolate terete rather turgid follicular mericarps. *Seeds* ovate, concave, ending in a silky coma.

TELOSMA PALLIDA, Craib in Kew Bull. 1911, 418. *Pergularia pallida*, W. & A. in Wt. Contrib. 42; F. B. I. iv. 38; Wt. Ic. t. 585.

N. Circars, Simhachelam Hill, Vizagapatam (W. Elliot) Deccan, Hyderabad (J Campbell), forests of Kurnool (Rangachari), Sandur Hills of Bellary (Gamble), foot of the Anamalai Hills (Beddome).

A slender climber with pale yellow nearly scentless flowers, a very membranous corona with rounded outer and lanceolate inner lamellae, long clavate pollen-masses, ovate-cordate acuminate leaves and long follicles.

Telosma minor, Craib, is a sweet-scented climber often grown in gardens in S. India and apparently sometimes found run wild, native of the Himalaya. It has greenish-yellow flowers, a corona which is spurred behind, short thick pollen-masses and ovate-cordate leaves with the basal lobes overlapping. The follicles are sometimes 6 in. long, linear-lanceolate, curved near the tip.

21. Marsdenia, R. Br.

Twining rarely erect shrubs. *Leaves* opposite. *Flowers* small or of moderate size, in terminal or axillary umbellate or corymbose cymes or panicles. *Calyx* 5-partite, usually with glands within at the base. *Corolla* campanulate urceolate or rotate, the lobes overlapping to the right in bud; corona-processes 5, membranous or hard or fleshy, adnate at the base to the staminal-column, free above. *Staminal-column* arising from the base of the corolla-tube; anthers erect, with membranous appendages more or less incumbent over the style-apex; pollen-masses erect, oblong, waxy, attached by usually short caudicles to the hard pollen-carriers. *Ovary* of 2 carpels; style short; style-apex large, convex or conical or depressed. *Fruit* of 2 (more usually 1 only, by abortion) lanceolate or dagger-shaped, acuminate follicular mericarps. *Seeds* ovate, flattened, margined, ending in a silky coma; cotyledons flat, ovate; radicle rather short.

Flowers in much corymbosely branching cymes; corona of erect slender hard processes bifid at apex; corolla villous without, glabrous within except for tufts of long hairs at the base, lobes reflexed and with incurved margins; leaves large, velvety, broadly ovate or orbicular, acuminate, cordate, up to 6 in. long, 4·5 in. broad ....1. *tenacissima.*
Flowers in few-branched, few-flowered cymes; corona of 2 membranous buttresses at base and a lanceolate tip; corolla glabrous, the lobes often marginate; leaves membranous, glabrous, ovate or orbicular, acuminate, cordate, up to 5 in. long, 4 in. broad .....2. *Brunoniana*
Flowers in umbellate, long-peduncled cymes with many green flowers on long pedicels; corona of large rounded fleshy lobes and a small piculus behind the anther-tip; corolla rotate, glabrous; leaves broadly ovate or suborbicular, abruptly acuminate, cordate or truncate or rounded at base, glandular above the petiole, up to 6 in. long, 4·5 in. broad ..... 3. *volubilis.*

1. MARSDENIA TENACISSIMA. W. & A. in Wt. Contrib. 41; F. B. I. iv. 35; Wt. Ic. t. 590. *Asclepias tenacissima,* Roxb. Cor. Pl. t. 240.

W. Ghâts, Lower Pulneys, at 3,000 ft. (Rodriguez).

A stout climbing shrub with large follicles 4–6 in. long. Bark thick, yellowish grey; wood white. It gives a very strong silky fibre, used in Northern India for fishing lines and other purposes. Vern. *Hind.* Tongus, Jitti.

2. MARSDENIA BRUNONIANA, W. & A. in Wt. Contrib. 36; F. B. I. iv. 36; Wt. Ic. t. 356.

Carnatic ? near Columala (Kollimalais?) (Wight).

A twining shrub.

3. MARSDENIA VOLUBILIS, T. Cooke Fl. Bomb. ii. 166. *Dregea volubilis*, Benth.; F. B. I. iv. 46. *Hoya viridiflora*, R. Br.; Wt. Contrib. 39, Ic. t. 586.

All Plains Districts and in the Hills up to 5,000 ft. in dry regions, common.

A large climbing shrub with green flowers and large woody follicles, blunt at the apex, 4 in. long and nearly 1 in. in breadth. Bark brown, rough, corky; wood white, soft. The stems give a strong fibre. Vern. *Hind.* Nak-chikni; *Mar.* Hirandoli. Ambri; *Tam.* Kurincha.

22. Cosmostigma, R. Br.

A twining glabrous shrub. *Leaves* opposite, membranous, ovate or cordate. *Flowers* small, in axillary or lateral racemose cymes with rather long peduncles. *Calyx* 5-partite; lobes ciliate; glands in pairs between the lobes. *Corolla* rotate, deeply 5-fid, the lobes slightly overlapping to the right; corona-processes erect, membranous, adnate to the base of the staminal-column and shorter than the anthers, truncate bifid trifid or slightly toothed. *Staminal-column* very short, anthers with a round inflexed membranous appendicle; pollen-masses erect, clavate, attached to the hard pollen-carriers by long slender twisted caudicles. *Ovary* of 2 carpels; style thick; style-apex broad, flat, 5-angled with a wavy rim. *Fruit* of 2 (or 1) large, lanceolate, blunt, smooth, follicular mericarps. *Seeds* ovate, margined, ending in a silky coma; cotyledons flat, elliptic.

COSMOSTIGMA RACEMOSUM, Wt. Contrib. 42; F. B. I. iv. 46; Wt. Ic. t. 591. *C. acuminatum*, Wt. Ic. t. 1270.

Deccan, in the hills of the Ceded Districts (Wight); Carnatic, Kollimalai Hills of Trichinopoly; W. Ghâts, Nilgiris; Coast of S. Travancore.

A climber with small greenish flowers with brown dots, the leaves acute or acuminate, up to 4 in. long, 3 in. broad.

23. Olanthus, Benth.

Twining undershrubs. *Leaves* opposite, usually ribbed from the base. *Flowers* in axillary few-flowered cymes. *Calyx* 5-partite; lobes small. *Corolla* ovoid-urceolate or disciform, contracted at the mouth; lobes 5, short, broad, valvate; corona adnate to the staminal column, cupular, spreading, fleshy, with an inner erect process. *Staminal-column* arising from the base of the corolla, minute, short, depressed; anthers with short inflexed appendages; pollen-masses ovoid ascending, attached by very short caudicles to the hard pollen-carriers. *Style-apex* broadly conical, 5-angular, not exserted beyond the anthers.

Olanthus Beddomei, Hook. f. Ic. Pl. t. 1466; F. B. I. iv. 49.
Wynaad, in the Beigoor forests (Beddome, fig. only).
A twining plant with curious cushion-like much-depressed flowers in axillary bracteolate cymes, broadly ovate acuminate subcordate leaves up to 5 in. long, 2·5 in. broad, and pubescent branches and petioles.

24. Heterostemma, W. & A.

Twining undershrubs. *Leaves* opposite, with a minute gland near the base on the upper surface, usually 3-5-ribbed from the base. *Flowers* small, in axillary umbellate or racemose cymes, shortly peduncled. *Calyx* 5-partite, minutely glandular within. *Corolla* rotate, the lobes broad, triangular, valvate; corona of 5 spreading lobes, usually with an erect process on the upper side. *Staminal-column* small, depressed; anthers minute, ending in a small membranous appendage; pollen-masses small, compressed, subquadrate or ovoid, attached by very short caudicles to the hard pollen-carriers. *Ovary* of 2 carpels; style-apex sessile, truncate, 5-angled. *Fruit* of 2 slender terete follicular mericarps, often reflexed. *Seeds* ovate, broadly margined, ending in a silky coma.

Heterostemma tanjorense, W. & A. in Wt. Contrib. 42; F. B. I. iv. 47; Wt. Ic. t. 348.
N. Circars, Rampa Hills of Godavari (Ramaswami); Deccan, in Coimbatore (Meebold); S. Carnatic, in sandy places near the sea at Point Calimere in Tanjore (Wight).
A slender twiner, with broadly ovate leaves, obtuse or

cordate at base, and up to 4 in. long, 2 in. broad; the linear follicles 4 in. long, reflexed, hooked at apex.

25. Hoya, R. Br.

Twining pendulous or rarely erect or rambling and rooting often epiphytic shrubs. *Leaves* opposite, thick and fleshy or coriaceous. *Flowers* in axillary lateral or terminal umbels. *Calyx* small, 5-partite, with 5 glandular scales. *Corolla* rotate, fleshy or waxy; lobes 5, often convex and spreading and reflexed, valvate in bud; corona of 5 fleshy membranous or horny processes adnate to the staminal column, stellately spreading or ascending, often concave on the upper surface, infolded to overlap on the lower, the inner margin usually produced in a spur which is erect or incumbent on the anther. *Staminal-column* usually short, arising from the base of the corolla; anthers conniving over the style apex with a membranous appendage; pollen-masses erect, waxy, usually flattened and sometimes with thickened outer edge, attached by distinct caudicles to the horny pollen-carriers. *Ovary* of 2 distinct carpels; style-apex 5-angled, the tip flattened or slightly apiculate. *Fruit* of 2 or 1 follicular mericarps, usually slender with a thin pericarp, rarely turgid with a thick one. *Seeds* small, ovate or oblong, ending in a long coma; cotyledons thick; radicle cylindric.

Leaves narrow; flowers very few in the umbels, usually 1–3 only :—

Leaves linear gradually dilated from the base to the obcordate tip, ·15 in. broad, about 2 in. long, the midrib conspicuous; flower pedicels ·5–·75 in. long; corolla white, shining, ·5–·75 in. in diam.; corona processes pink, acutely spurred ..... 1. ***retusa***.

Leaves linear-lanceolate, obtuse, 1–2 in. long, ·25 in. broad, the midrib strong; flower pedicels ·75–1 in. long; corolla white, ·75 in. in diam., the margins crispate-pubescent; corona processes purple, the spur recurved ..... 2. ***pauciflora***.

Leaves ovate or elliptic; flowers in many-flowered umbels :—

Corolla glabrous or minutely puberulous within :—

Leaves elliptic or elliptic-lanceolate, abruptly and rather long acuminate at apex, the margins recurved, up to 3·5 in. long, 1·5 in. broad, the main nerves (when dry) nearly horizontal, meeting in an intramarginal looped nerve, pedicels 1 in. long; corona-processes concave above; pollen masses slender, spathulate .... 3. ***Wightii***.

Leaves elliptic or elliptic-ovate or -lanceolate, obtuse or acute at

apex, the margins not recurved, up to 4 in. long, 1·5 in. broad, t main nerves (when dry) oblique, inconspicuous, pedicels ·5 in. lon corona-processes concave above with raised edges; pollen mas thickened on the outer margins .....4. *ovalifol*

Corolla densely silky-villous within; leaves ovate, acute, the marg recurved, up to 2·5 in. long, 1 in. broad, main nerves obscure; pedic nearly 1 in. long; corona-processes apparently flat above..5. *pendu*

1. **Hoya retusa**, Dalz.; F. B. I. iv. 56.
   S. Canara, at Gundiar (Meebold).
   A pendulous slender epiphyte.
2. **Hoya pauciflora**, Wt. Ic. t. 1269; F. B. I. iv. 56.
   W. Ghâts, Sispara in Nilgiris (Lawson), Atapadi Hills Malabar, at 4,200 ft. (Fischer), hills of Cochin, Tinnevel and Travancore, at 3,000–4,000 ft. (Wight, etc.).
   A slender climber, apparently epiphytic and rooting, t follicles very slender, up to 6 in. long.
3. **Hoya Wightii**, Hook. f.; F B. I. iv. 59. *H pendu* W. & A. in Wt. Contrib. 36 (excl. syn.).
   W. Ghâts, hills of Coimbatore, Nilgiris, Anamalais a hills of Tinnevelly, at 4,000–6,000 ft.
   A stout climber, apparently epiphytic and rooting, t corolla white or greenish, the corona purple, the follicl very slender, up to 4 in. long.
4. **Hoya ovalifolia**, W. & A. in Wt. Contrib. 37; F. B. I. 60; Wt. Ic. t. 847 (not good).
   W. Ghâts, from S. Canara southwards, not common.
   A glabrous, robably epiphytic, trailer, with pale stra coloured corc la.
5. **Hoya pendula**, Wt. Ic. t. 474; F. B. I. iv. 61.
   N. Circars (*fide* Roxburgh); Nilgiri Hills (Wight).
   A slender twining epiphyte with white silky-villous corol

Specimens in leaf only received from Mr. A. W. Lushingt from the hills of Vizagapatam, 3,500 ft. seem to belong to t N. Indian species *H. longifolia*, Wall. and *H. parasitica*, Wall.

26. Leptadenia, R. Br.

Shrubs, climbing c erect and then with stiff rush-like sten *Leaves* opposite, variable, sometimes absent. *Flowers* small, umbellate, lateral or axillary, sessile or pedunculate, man

flowered cymes. *Calyx* 5-lobed to the middle or beyond, eglandular. *Corolla* deeply 5-lobed, rotate or with a short campanulate tube; lobes 5, valvate in bud, the margins recurved, pubescent or bearded within; corona double, the outer corolline of 5 fleshy processes at the sinuses of the corolla-lobes, the inner staminal of a raised undulate fleshy ring at the base of the staminal column. *Staminal-column* arising from the base of the corolla; anthers incumbent on the style-apex with no or minute appendages; pollen-masses suberect or erect, with a pellucid apex, attached by short caudicles to the pollen-carriers. *Ovary* of 2 carpels; style-apex conical, 5-angled, the tip often bifid. *Fruit* of usually one thick smooth follicle. *Seeds* small, oblong, winged, ending in a silky coma.

LEPTADENIA RETICULATA, W. & A. in Wt. Contrib. 47; F. B. I. iv. 63; Wt. Ic. t. 350. *L. imberbis*, Wt. Contrib. 48.

N. Circars, Deccan and Carnatic, westward to the E. slopes of the Ghâts, up to about 3,000 ft., chiefly in hedges.

A climbing shrub with pale leaves, yellowish flowers and thick sub-woody follicle with a curved obtuse beak. Bark yellowish-brown, rough, thick; wood white, fibrous. Vern. *Mar.* Kharkhoda.

27. Brachystelma, R. Br.

Erect or twining slender herbs from a tuberous root. *Leaves* opposite or verticillate, very narrowly linear. *Flowers* small, in axillary umbelliform sessile or peduncled cymes; pedicels filiform. *Calyx* 5-partite; lobes linear or lanceolate, glandular within. *Corolla* campanulate-rotate, deeply 5-lobed, the lobes sometimes adherent at the tips, valvate or slightly overlapping to the right in bud, narrowly linear, glabrous or villous; corona adherent to the staminal tube, annular, shortly lobed or with 5 subulate teeth. *Staminal-column* very short, anthers erect, not appendiculate; pollen-masses erect, globose-ellipsoid, with a pellucid margin or upper angle, attached by very short caudicles to the hard pollen-carriers. *Ovary* of 2 carpels; style-apex nearly flat. *Fruit* of 2 very slender smooth follicular mericarps. *Seeds* ending in a silky coma.

Stem erect:—

Corona shortly toothed without subulate processes; stem short,

6–9 in. long; corolla-lobes linear from a broad base, glabrous, ·2–·3 in. long; leaves linear, up to 3·5 in. long, ·1 in. broad; umbels terminal, sessile or pedunculate with few flowers .....1. *glabrum.*

Corona with 5 subulate processes, undulate or toothed between them:—

Corolla-lobes with purple hairs:—

Corolla-lobes narrowly triangular, ·3–·5 in. long; corona-processes ·1 in.; leaves linear, up to 4 in. long and extremely narrow; cymes sessile or shortly peduncled, 3-flowered.....2. *Bourneae.*

Corolla-lobes linear, ·2 in. long, keeled down the middle; corona processes ·1–·15 in. long; leaves almost filiform, 3–4 in. long, ·1 in. broad; umbels sessile, 3–5-flowered .....3. *maculatum.*

Corolla-lobes densely white-villous within, linear, ·5–·7 in. long; corona-processes ·1–·15 in. long; leaves linear, 3 in. long, extremely narrow; umbels 5- or more-flowered .....4. *Rangacharii.*

Stem twining; corona undulately lobed:—

Corolla-lobes not adherent at the tips, linear-lanceolate from a broad base, the margins incurved, white-villous within, ·4 in. long; leaves very slender, up to 5 in. long; peduncles short, 3–4-flowered 5. *volubile.*

Corolla-lobes adherent at the tips, very slender, ·75–1 in. long, glabrous, pale without; leaves linear, up to 4 in. long, ·25 in broad; peduncles short, 3-flowered .....6. *brevitubulatum.*

1. BRACHYSTELMA GLABRUM, Hook. f.; F. B. I. iv. 65.
   Deccan, hills of the Cuddapah District (Beddome).
   A short slender herb, glabrous, the flower small, terminal.
2. BRACHYSTELMA BOURNEAE, Gamble in Kew Bull. 1922, 120.
   W. Ghâts, Eastern slopes of the Pulney Hills, at low levels (Bourne).
   A tall, very slender herb, the corolla greenish-white with dark green spots, the hairs on the lobes and the corona purple, the tubers thick, fusiform
3. BRACHYSTELMA MACULATUM, Hook. f.; F. B. I. iv. 65.
   "Canara and Mysore" (Law); Dimbhum in Coimbatore (Rangachari).
   A tall slender herb, the corolla-tube spotted, the lobes with stiff purplish hairs, the tubers fusiform.
4. BRACHYSTELMA RANGACHARII, Gamble in Kew Bull. 1922, 120.
   Deccan, Hassanur in Coimbatore (Rangachari).
   A tall, very slender herb, the corolla apparently pale and very white villous within, the tubers oblong.

5. BRACHYSTELMA VOLUBILE, Hook. f.; F. B. I. iv. 65.

Deccan, hills of the Cuddapah District, at about 2,000 ft. (Beddome).

A very slender twining herb.

6. BRACHYSTELMA BREVITUBULATUM, Gamble n. comb. *Ceropegia brevitubulata*, Bedd. Ic. t. 174. *Brachystelma Beddomei*, Hook. f.; F. B. I. iv. 66.

Deccan, dry rocky hills above Amerdy, Vellore. about 1,000 ft. (Beddome).

A slender twining herb, the corolla-lobes greenish-yellow outside, deep purple within, cohering at their tips, the follicles very slender, 4–5 in. long.

28. Ceropegia, Linn.

Perennial herbs, erect or twining; rootstock a tuber or a fascicle of thick fleshy roots. *Leaves* opposite, sometimes minute or 0. *Flowers* usually moderate-sized or large, solitary in pairs or in axillary umbellate or racemose cymes, variously coloured; bracteoles often many. *Calyx* 5-partite, with 5 glandular scales within; lobes narrow. *Corolla* tubular, the tube usually more or less inflated at the base, then elongate, straight or curved, often funnel-shaped, 5-lobed; lobes valvate in bud, more or less connate at their tips; corona double, arising from the staminal column, the outer annular or cupular, entire or 5–10-toothed or of 5 bifid lobes more or less adnate to the inner of 5 short or long processes opposite to the anthers and incumbent on them or erect. *Staminal-column* short, included in the base of the tube; anthers short, erect, without appendages; pollen-masses erect or sub-horizontal, waxy, with one pellucid margin, attached to the pollen-carriers by short caudicles. *Ovary* of 2 carpels; style-apex truncate or shortly conical. *Fruit* of 2 lanceolate or linear, smooth, acuminate follicular mericarps. *Seeds* usually oblong, margined, ending in a silky coma; cotyledons small or large, sometimes smaller than the thick radicle.

Stem erect, from a tuberous root; leaves linear; calyx-lobes very slender:—

Leaves rarely 1–2 in. long, usually less, crowded on a very short stem close to the ground; flowers solitary, scarcely ·75 in. long, the tube of the corolla narrow from an inflated base, the lobes ·2 in. long, meeting at the tips; outer corona-lobes bifid, inner linear . . 1. *pusilla*.

Leaves usually 2–6 in. long, opposite on a stem 4–9 in. high ; flowers solitary 1–1·5 in. long, the corolla-tube subcylindric, not inflated, the lobes about as long as the tube, narrowed downwards and having at the base a ring of purple-tipped hairs ; outer corona-lobes bifid, ciliate, inner linear-spathulate .....2. *fimbriifera.*

Leaves 4–8 in. long, very narrow, often curved and twisted at tip, opposite on a slender stem up to 1 ft. long ; flowers solitary, 1·5–2 in. long, corolla-tube with the base slightly inflated, then cylindric, the slender lobes spirally contorted ; outer corona-lobes acute, glabrous, inner filiform .....3. *spiralis.*

Stem twining, from a tuberous or fibrous fleshy root :—

Leaves fleshy, root tuberous :—

Leaves very small or 0, when present sessile, lanceolate, acute, ·5–·75 in. long ; flowers in 3–5-flowered umbellate pedunculate cymes, the corolla 1·5–2 in. long, tube with base slightly inflated, then funnel-shaped, lobes about as long as the tube, connate at tip ; outer corona-lobes deeply bifid, ciliate, inner linear-spathulate, hooked at tip .....4. *juncea.*

Leaves very variable, linear lanceolate ovate or orbicular, rarely over 1–1·5 in. long or broad ; flowers in 3–7-flowered pedunculate cymes, the corolla ·5–·75 in. long, tube with base inflated then cylindric, lobes short ; outer corona-lobes minute, inner linear 5. *bulbosa.*

Leaves membranous :—

Corolla-lobes broad, forming a hemispheric or broadly conical dome over the broadly funnel-shaped mouth of the curved tube :—

Corolla-lobes with long soft ciliae at the mouth, base of tube inflated, globose or oblong and gibbous, length of corolla 1·5–2 in. ; outer corona-lobes subulate, nearly as long as the inner processes ; leaves ovate or lanceolate, acuminate; up to 4 in. long, 1·5 in. broad .....6. *elegans.*

Corolla-lobes without ciliae at the mouth ; outer corona-lobes subulate, shorter than the inner processes :—

Leaves ovate, acuminate, somewhat abruptly, at apex, rounded or cordate at base, up to 2·5 in. long, 2 in. broad ; corolla-tube inflated and globose at base, then slender, then broadly funnel-shaped, corolla 1–1·5 in. long in all .....7. *mysorensis.*

Leaves lanceolate, long acuminate at apex, acute at base, up to 3 in. long, 1 in. broad ; corolla-tube inflated and oblong at base, then slender, then funnel-shaped, corolla 2–2·5 in. long in all .....8. *Walkerae.*

Corolla-lobes narrow, shorter than the neck of the tube, forming a conical ovoid or beaked crown over the not much dilated mouth of the tube :—

Leaves and peduncles glabrous :—

Crown in bud long-beaked by the connivent upper parts of the lobes, which are free later ; corolla-tube inflated and prominently veined at base, then cylindric, whole length 1–1·5 in.; outer corona-lobes very short, inner processes linear-clavate, connate at tip ; leaves variable, ovate orbicular or lanceolate, apiculate, up to 4 in. long, 2 in. broad .....9. *tuberosa.*

Crown in bud very shortly beaked by the connivent tips of the corolla-lobes, afterwards opened in a short dome, the lobes sometimes finally free :—

Corollas about 1 in. long, the flowers erect in umbelliform cymes on pendulous peduncles ·75 in. long, the tube inflated below, then cylindric, the lobes ciliate within ; outer corona-lobes very small, inner processes spathulate ; leaves elliptic-ovate or -lanceolate, acuminate, apiculate, up to 4 in. long, 1·5 in. broad .....10. *Candelabrum.*

Corollas about ·5 in. long, the flowers in 4–7-flowered axillary cymes on short peduncles, under ·5 in. long, the tube slightly inflated below, then funnel-shaped, the crown short ; outer corona-lobes minute, inner long, filiform ; leaves linear-lanceolate, long-acuminate, 3–4 in. long, ·2–·3 in. broad, broadest near the base .....11. *acuminata.*

Crown in bud not beaked, the broad lobes arched and connate only by their tips, free later ; corollas usually curved :—

Corollas ·75–1·25 in. long, tube inflated at base, then narrowly cylindric, then funnel-shaped, the lobes ·2 in. long ; outer corona-lobes very small and thin, inner processes erect, spathulate ; leaves ovate- or elliptic-lanceolate, sometimes linear-lanceolate, acuminate, up to 5 in. long, 2 in. broad 12. *intermedia.*

Corollas 2–2·5 in. long, tube inflated at base, then narrowed, then funnel-shaped, the lobes about ·6 in. long ; outer corona-lobes thin, triangular, ciliate, inner processes subulate clavate, slightly longer ; leaves elliptic-ovate or -lanceolate, acuminate, up to 5 in. long, 2·5 in. broad....13. *Thwaitesii.*

Leaves and peduncles hispid-pubescent :—

Peduncles 1–5 in. long, stout, hispid, bearing very many-flowered umbelliform often branching cymes, the corolla slender, up to 1 in. long, the base of the tube slightly inflated,

the lobes joining in a short oblong head; outer corona-lobes short ciliate, inner processes slender, hooked; leaves linear-ovate or -lanceolate, up to 3 in. long, ·75 in. broad

14. ***ciliata.***

Peduncles ·5–1 in. long, stout, few-flowered; corolla 1–1·5 in. long, tube slightly inflated below, funnel-shaped above, the lobes up to ·5 in. long; outer corona-lobes 2-fid, ciliate, inner processes spathulate; leaves from narrowly linear to ovate-lanceolate, acuminate, obtuse or cordate at base, up to 4 in. long, 1·5 in. broad (much longer and narrower in var.)

15. ***hirsuta.***

Corolla-lobes about as long as or longer than the neck of the tube:—

Corolla-tube much inflated at base, curved and broadly funnel-shaped upwards, the lobes narrow; corona-lobes short, ciliate, processes erect, linear:—

Leaves oblong-ovate or linear-lanceolate, acuminate, under 1·5 in. broad:—

Inflated base of corolla-tube broad, gradually narrowed into the neck; leaves linear-lanceolate, under 1 in. broad

16. ***Decaisneana.***

Inflated base of corolla-tube broad, suddenly narrowed into the neck; leaves ovate-lanceolate, over 1 in. broad

17. ***brevicollis.***

Leaves ovate or ovate-cordate, acuminate, up to 5 in. long, 2 in. broad; corolla-tube not much inflated, narrowed into the neck, the lobes long and linear .....18. ***Stocksii.***

Corolla-tube not or only slightly inflated at base, narrow above and straight:—

Corolla small, pale; flowers in fascicles on an elongate peduncled raceme:—

Corolla ·5 in. long or little more, the lobes about as long as the base and neck of the tube; outer corona-lobes short, obtuse, ciliate, inner processes linear, erect; leaves linear, up to 6 in. long, ·2 in. broad .....19. ***ensifolia.***

Corolla 1 in. long, the lobes about as long as the base and neck of the tube; outer corona-lobes very short, ciliate, inner processes long, spathulate; leaves ovate- or linear-lanceolate, up to 4 in. long, 1 in. broad ....20. ***albiflora.***

Corolla dark purple, 3 in. long, slender, the tube slightly inflated at base, then narrowly funnel-shaped, the slender lobes about as long as the whole tube, villous within; outer corona-lobes

short, notched, ciliate, inner processes clavate; leaves linear-lanceolate, long acuminate, up to 6 in. long, ·5 in. broad 21. *Beddomei.*

1. CEROPEGIA PUSILLA, W. & A. in Wt. Contrib. 31; F. B. I. iv. 66; Wt. Ic. t. 1261.

   W. Ghâts, Nilgiris, on the grassy downs above 7,000 ft.

   A minute herb with a depressed tuber about 1 in. in diam. said to be eaten and to be sought for as food by wild pigs. The corollas are pale in colour with purple stripes shading into pink on the tube and lobes. Follicles fusiform, 1·5 in. long.

2. CEROPEGIA FIMBRIIFERA, Bedd. Ic. t. 172; F. B. I. iv. 66.

   W. Ghâts, Anamalais, in rocky grassy places near Tunacadavu at 3,000–4,000 ft. (Beddome).

   A slender erect herb with a depressed tuber. The corollas have the tube greenish without, striped with deep purple within, and the lobes pale greenish purple, the fringe deep purple.

3. CEROPEGIA SPIRALIS, Wt. Ic. t. 1267; F. B. I. iv. 66.

   Deccan, hills of the Cuddapah District, probably at about 2,000–3,000 ft.

   A slender erect, or slightly twining herb with a depressed tuber and grass-like leaves. The corollas apparently have the base greenish outside, purplish within, the mouth purple and the twisted lobes also dark-coloured. Follicles very slender about 5 in. long.

4. CEROPEGIA JUNCEA, Roxb. Cor. Pl. t. 10; F. B. I. iv. 68; Wt. Contrib. 30.

   N. Circars, Deccan and Carnatic and S. Travancore in dry forests.

   A fleshy twining plant with branched fibres from the tuberous root, which is edible. The flowers are greenish, speckled and veined with pink and purple, the follicles narrow, up to 5 in. long, long beaked, seeds with the radicle twice as long as the cotyledons. Wight remarks that he has found it growing among the branches of *Euphorbia Tirucalli.* Vern. *Tel.* Bella gada; *Mar.* Kanvel.

5. CEROPEGIA BULBOSA, Roxb. Cor. Pl. t 7; F. B. I. iv. 67; Wt. Contrib. 32; Wt. Ic. t. 845.

Deccan and Carnatic, in dry localities, and especially near the coast; S. Canara and Malabar.

A fleshy twining herb with a round depressed tuber. The small flowers are greenish, the lobes purple within; the follicles very slender, 3 in. long, the radicle as long as the cotyledons and divided. The leaves and tubers are edible. Vern. *Tal.* Manchi manda.

Var. *Lushii*, Hook. f. *C. Lushii*, Grah. in Bot. Mag. t. 3300. Leaves very narrowly linear, 2–4 in. long.

Deccan, hills of Cuddapah (Beddome).

6. CEROPEGIA ELEGANS, Wall.; F. B. I. iv. 68; Wt. Contrib. 31, Ic. t. 1265, Spic. Neilg. t. 155.

W. Ghâts, Nilgiri and Pulney Hills, at 3,000–6,000 ft.

A very pretty slender twiner, the corolla pale blue or green, spotted with purple, the tips of the lobes and the ciliae deep purple; the follicles are very slender, reaching 7–8 in. in length.

7. CEROPEGIA MYSORENSIS, Wt. Ic. t. 846; F. B. I. iv. 69.

Deccan, Mysore and Coimbatore, up to 3,000 ft.; hills of Tinnevelly.

A slender twiner, the corolla pale green below, bluish above, and spotted with red on the funnel, the tips of the lobes deep purple to nearly black. Follicles very slender, about 6 in. long.

8. CEROPEGIA WALKERAE, Wt. Ic. t. 1266; F. B. I. iv. 69.

W. Ghâts, in Wynaad, at about 3,000 ft.; Coorg? (Bourne).

A very slender twiner, the corolla pale blue with minute purple spots, a little like those of *C. elegans* but without the ciliae, and the dome of the corolla less depressed.

9. CEROPEGIA TUBEROSA, Roxb. Cor. Pl. t. 9.; F. B. I. iv. 70; Wt. Contrib. 32, Ic. t. 353.

N. Circars, Deccan and Carnatic to the lower slopes of the Ghâts, up to about 3,000 ft., common.

A glabrous twiner with tuberous roots giving out fleshy fibrous ones. The corolla is pale green, yellowish inside, purple at the tips of the lobes, and the follicles are very slender, up to 5 in. long, the seeds strongly margined.

10. CEROPEGIA CANDELABRUM, Linn.; F. B. I. iv. 70. ***C. Elliottii***, Hook. f.; F. B. I. iv. 70.

N. Circars, Simhachelam Hill, Vizagapatam (W. Elliot);

W. Ghâts, hills of Coimbatore, Nilgiris, and hills of Travancore W. Coast, S. Canara to Travancore.

A slender climber with corollas apparently green below, the tips purplish, the veins prominent; follicles linear, very slender. Rheede, Hort. Mal. ix. t. 16, a striking picture, shows umbels with all the flowers in bloom at the same time, which is unlikely.

11. CEROPEGIA ACUMINATA, Roxb. Cor. Pl. t. 8; F. B. I iv. 70; Wt. Contrib. 32. *C. discreta*, N. E. Br. in Kew Bull. 1909, 262?

Eastern Coast, cultivated in Madras (Bourne), Coimbatore?

A slender twiner growing from a flattened tuber, the corollas very small, pale, almost white, with purplish tips to the lobes. Follicles curved, 3 in. long, slender. Roxburgh says that all parts are edible. Vern. *Tel.* Commoo manda.

12. CEROPEGIA INTERMEDIA, Wt. Ic. t. 1263; F. B. I. iv. 71.

W. Ghâts, from Wynaad to the Anamalais, Pulneys and hills of Travancore and Tinnevelly, at 2,000–3,000 ft.

A slender twiner from a fibrous rootstock, the corollas pale purplish below, the lobes darker, the follicles very slender and straight, 5–6 in. long.

Var. *Wightii*, Hook. f.; leaves linear lanceolate, usually under ·5 in. broad, the follicles rather shorter.

Pulney Hills and hills of Tinnevelly (Wight, Bourne).

13. CEROPEGIA THWAITESII, Hook. Bot. Mag. t. 4758; F. B. I. iv. 71.

W. Ghâts, Pulney Hills and hills of Tinnevelly and Travancore, 2,500–7,000 ft.

A rather stout twiner, the corolla pale green with purple blotches on the tube, also a purple band across the lobes and white and green above it. Follicles very long and slender, almost up to 12 in., the tips hooked; the seeds are long, the radicle thick, nearly as long as the oblong cotyledons.

14. CEROPEGIA CILIATA, Wt. Ic. t. 1262; Spic. Neilg. t. 154; F. B. I. iv. 72.

W. Ghâts, Nilgiris at 6,000–7,000 ft., common, less so in the Anamalais and hills of Tinnevelly.

A slender hispid twiner from a round, rather flattened

tuber, the corolla pale green outside, purplish within, the lobes dark green or lead-coloured; follicles short, slender.

15. CEROPEGIA HIRSUTA, W. & A. in Wt. Contrib. 30; F. B. I. iv. 71. *C. vincaefolia*, Hook. Bot. Mag. t. 3740.

N. Circars, in Ganjam (Fischer); Rampa Hills of Godavari (Narayanswami),; W. Ghâts, Nilgiri Hills (Wight), Anamalais (Beddome).

A hispid climber with tuberous roots, the corolla greenish with small purple spots, the lobes red-purple; calyx lobes long and slender; follicles narrow, 4 in. long. The leaves are very variable, running from broadly ovate to linear (in the var.).

Var. *stenophylla*, Hook. f. Leaves very narrowly linear, up to 6 in. long, ·2 in. broad; corolla more purple spotted, the cone of the lobes crowned by pale and purple bands olive-green above; inner corona-processes clavate; tuber rather small, flattened-globose.

W. Ghâts, Anamalais and Pulneys at 3,000–5,000 ft.

16. CEROPEGIA DECAISNEANA, Wt. Ic. t. 1259, Spic. Neilg. t. 152; F. B. I. iv. 73.

W. Ghâts, on the Sispara Ghât, Nilgiris (Wight, Gardner).

A slender climber with tuberous root and narrow leaves, the large corolla much inflated, green with pale purple spots all over, the corona orange, tipped with purple; follicles very slender.

17. CEROPEGIA BREVICOLLIS, Hook. f.; F. B. I. iv. 74.

W. Ghâts, Anamalai Hills at 2,000–3,000 ft.

A slender climber with irregularly purple-spotted corolla, very short in the neck of the tube; follicles nearly 1 ft. long, very slender.

18. CEROPEGIA STOCKSII, Hook. f.; F. B. I. iv. 74.

W. Ghâts, Wynaad, Anamalais and hills of Travancore at 2,000–4,000 ft., in moist forests.

A rather large climber with corollas green shaded with purple and with purple spots on the funnel part of the tube; follicles very slender, nearly 1 ft. long.

19. CEROPEGIA ENSIFOLIA, Bedd. Ic. t. 173; F. B. I. iv. 75.

W. Ghâts, Anamalai Hills, in rocky places, 3,000–3,500 ft. (Beddome).

A slender twiner with subglobose tubers, very narrow leaves, greenish-white corollas and slender follicles 6–7 in. long.

20. CEROPEGIA ALBIFLORA, Hook. f.; F. B. I. iv. 75.
W. Ghâts, hills of Travancore near Peermerd, 3,500 ft. (Beddome).
A slender twiner with long-peduncled inflorescence, white corollas and more or less lanceolate leaves with very oblique nerves.

21. CEROPEGIA BEDDOMEI, Hook. f ; F. B. I. iv. 75.
W. Ghâts, hills of Travancore, on the Peermerd Ghât, 2,500 ft. (Beddome), hills of Cochin (Johnstone).
A slender twiner with slender flowers, dark purple without, mottled with pale reticulations within the lobes.

29. Caralluma, R. Br. (ampl.).

Perennial herbs with angular fleshy stems, usually with many branches. *Leaves* minute, deciduous, on the angles of the stems, often spine-like. *Flowers* in few-flowered fascicles at the upper nodes or in terminal umbels, subsessile or pedicellate. *Calyx* 5-partite; lobes narrow, glabrous. *Corolla* rotate or broadly campanulate: lobes 5, valvate in bud; corona double, the outer annular or cupular, with 5 2-cuspidate lobes, the inner adnate to the outer, elongate and inflexed over the anthers. *Staminal-column* short, arising from the base of the corolla; anthers not appendaged; pollen-masses erect, suborbicular, compressed, pellucid on the inner margin or at the apex, attached by short slender caudicles to the pollen-carriers. *Ovary* of 2 carpels; style-apex truncate, 5-angled. *Fruit* of 2 linear or linear-lanceolate, smooth, follicular mericarps. *Seeds* oblong, flattened, broadly margined, ending in a silky coma; cotyledons small, much shorter than the large fleshy radicle.

Flowers solitary or in pairs, lateral on elongate branchlets; corolla-lobes narrow :—

Corolla-lobes glabrous, without fringes, lanceolate, acute; flower-bearing branchlets very slender, hardened; coma of the seeds white ..... 1. *adscendens*.

Corolla-lobes fringed with long soft deciduous purple hairs, lanceolate, apiculate, usually folded; flower-bearing branchlets narrow, fleshy; coma often straw-coloured ..... 2. *attenuata*.

Flowers in terminal umbels; corolla-lobes broad :—
Umbels many-flowered :—
Corolla glabrous :—
Corolla within red or purple, streaked within concentrically with many minute red, purple and yellow fine lines.....3. *umbellata.*
Corolla within dark red, not streaked, outside greenish 4. *campanulata.*
Corolla ciliate on the margin only .....5. *diffusa.*
Corolla with long scattered hairs on the face and margin 6. *lasiantha*
Umbels few-flowered, the corolla pale, fringed on the margins 7. *indica.*
Umbels reduced to a single flower; corolla fringed or villous with purple hairs ..... 8. *pauciflora.*

1. CARALLUMA ADSCENDENS, R. Br.; F. B. I. iv. 76; Wt Contrib. 33. *Stapelia adscendens*, Roxb. Cor. Pl. t. 30.
N. Circars, Deccan and Carnatic, in arid places, among bushes, scarce.
A fleshy herb, sometimes eaten, the corolla yellowish, with dark purple tips to the lobes, the follicles slender, 4–5 in. long. Vern. *Tel.* Kar allum.
2. CARALLUMA ATTENUATA, Wt. Ic. t. 1268; F. B. I. iv. 76. *C. fimbriata*, Hook. f.; F. B. I. iv. 77, *not of* Wall.
N. Circars, Deccan and Carnatic, up to 2,000 ft. in the hills and on dry slopes of the Ghâts, among shrubs, common.
A fleshy herb, said to be edible, the corolla banded white or green and purple on the tube and lower part of the lobes, the upper part dark purple and with purple fringes, the follicles linear-lanceolate, 4–6 in. long.
3. CARALLUMA UMBELLATA, Haw. Syn. Pl. Succ. 47. *Boucerosia umbellata*, W. & A. in Wt. Contrib. 34, Ic. t. 495; F. B. I. iv. 77. *Stapelia umbellata*, Roxb. Cor. Pl. t. 241.
N. Circars, Deccan and Carnatic, up to 4,000 ft. in hilly regions, on dry and arid lands, rather common.
An erect branching succulent herb, with large and striking flowers, the follicles slender, hooked.
4. CARALLUMA CAMPANULATA, N. & E. Br. in Gard. Chron. 1892, ii. 369; Bot. Mag. t. 7274. *Boucerosia umbellata*, W. & A. var. *campanulata*, Hook. f.; F. B. I. iv. 77. *B. campanulata*, Wt. Ic. t. 1289.

S. Deccan and Carnatic to the E. slopes of the Ghâts, apparently scarce.

An erect branching succulent with striking flowers, impossible to distinguish from the last in dried specimens, but good drawings exist.

5. CARALLUMA DIFFUSA, N. E. Br. *Boucerosia diffusa*, Wt. Ic. t. 1599; F. B. I. iv. 78.

Deccan, arid rocky hills in Coimbatore at about 2,000 ft.

A diffuse procumbent fleshy herb with many ascending branches, the corolla dark purplish-brown with many very fine whitish concentric lines, the follicles slender, nearly 6 in long.

6. CARALLUMA LASIANTHA, N. E. Br. *Boucerosia lasiantha*. Wt. Ic. t. 1286.

Deccan, hills of the Chittoor District (Wight, etc.), dry lands near Gooty.

A many-branched fleshy herb, the corolla very villous.

7. CARALLUMA INDICA, N. E. Br. *Hutchinia indica*, W. & A. in Wt. Contrib. 35. *Boucerosia Hutchinia*, Dcne; F. B. I. iv. 78.

E. Coast, Nellore (Wight), S. Arcot (Lawson).

A small fleshy herb with many slender stems scarcely ·2 in. in diam., acute leaves and pale greenish-white corolla, outwardly tinged with purple and with purplish hairs and fringes.

8. CARALLUMA PAUCIFLORA, N. E. Br. *Boucerosia pauciflora*, Wt.; F. B. I. iv. 78.

S. Carnatic, in Tinnevelly and S. Travancore.

A small diffuse fleshy herb with slender stems, minute recurved leaves and a pale corolla minutely banded with slender purple concentric lines within, whitish without.

Cryptostegia grandiflora, R. Br., is a stout climbing shrub with large rose-coloured showy flowers, which, a native of tropical Africa, is much grown in gardens and has become more or less naturalised. It gives a fairly good caoutchouc, which is not, however, an article of commerce.

Family CI. LOGANIACEAE.

Trees, erect or climbing shrubs or herbs. *Leaves* opposite, rarely ternate, entire; stipules present or reduced to a transverse

line. *Flowers* usually regular, hermaphrodite, in terminal or axillary simple or compound cymes, sometimes solitary. *Calyx* small inferior, lobes 4–5. *Corolla* gamopetalous, 4–5-lobed, the lobes imbricate or valvate. *Stamens* 4–5, inserted on the corolla-tube, alternate with the lobes; anthers 2-celled, introrse. *Ovary* free, usually 2-celled; ovules 1–many in each cell; style simple; stigma capitate or bifid. *Fruit* a septicidal capsule or indehiscent berry. *Seeds* various; albumen fleshy or cartilaginous; embryo straight.

Ovary with many ovules in each cell:—
Herbs; corolla valvate; capsule didymous:—
Cymes 2- or 3-chotomous; flowers 5-merous .....1. **Mitreola.**
Flowers solitary or clustered, 4-merous .....2. **Mitrasacme.**
Shrubs, often scandent, or trees:—
Fruit dehiscent, capsular, 2-celled; corolla-lobes imbricate 3. **Buddleia.**
Fruit indehiscent:—
Corolla-lobes contorted in aestivation; leaves succulent 4. **Fagraea.**
Corolla-lobes valvate in aestivation; leaves usually coriaceous, 3- or more-ribbed .....5. **Strychnos.**
Ovary with 1 ovule in each cell; corolla rotate; climbers ..6. **Gardneria.**

1. Mitreola, Linn.

Herbs. *Leaves* opposite, membranous; stipules small or reduced to a transverse line. *Flowers* small, white, in 2–3-chotomous terminal or axillary peduncled cymes, often unilateral on the cyme-branches. *Calyx* 5-partite; lobes lanceolate. *Corolla* urceolate; lobes 5, short, valvate. *Stamens* 5, included; filaments short; anthers ovate cordate. *Ovary* 2-celled; ovules many in each cell, on peltate placentas; styles 2, short, connate under a small pilose stigma, at length divergent. *Fruit* a laterally compressed, truncate or 2-horned capsule, the carpels at first separating, then dehiscing along the inner face. *Seeds* very many, minute, globose or elongate; albumen fleshy linear; cotyledons small; radicle terete.

MITREOLA OLDENLANDIOIDES, Wall.; F. B. I. iv. 79.
N. Circars, in Ganjam, open places in Sal forest.
An annual herb reaching 6–18 in. in height, the leaves [illegible] ovate or -lanceolate, up to 3 in. long, 1 in. broad, the long unilateral cyme-branches characteristic.

2. Mitrasacme, Labill.

Small slender herbs. *Leaves* opposite; petioles joined in a small sheath. *Flowers* small, white or yellowish, terminal or axillary, solitary clustered or in irregular umbels. *Calyx* campanulate, 4-fid. *Corolla* campanulate; lobes 4, valvate. *Stamens* 4, inserted near the base of the corolla-tube, usually included. *Ovary* 2-celled; ovules many in each cell, on peltate placentas; styles 2, at first connate, afterwards free under the capitate or 2-lobed stigma. *Fruit* a subglobose capsule, usually compressed contrary to the septum, truncate or 2-horned at apex; carpels at first separating, then dehiscing down the inner face. *Seeds* numerous, minute, subglobose; testa smooth, sometimes reticulate; albumen fleshy; embryo straight.

Stems and leaves glabrous; leaves linear or lanceolate; flowers axillary, fascicled 1–3 together on filiform pedicels; corolla very small, about ·1 in. long; seeds with reticulate testa ..... 1. *alsinoides.*
Stems and leaves hirsute; leaves elliptic-ovate; flowers in terminal lax few-flowered umbels, pedicels filiform; corolla ·2–·25 in. long; seeds with smooth or punctate testa ..... 2. *polymorpha.*

1. MITRASACME ALSINOIDES, R. Br.; F. B. I. iv. 80. *M. indica*, Wt. Ic. t. 1601 (1).
   Deccan and Carnatic; W. Coast, S. Canara to Travancore.
   A very slender annual herb, under 6 in. high.
2. MITRASACME POLYMORPHA, R. Br.; F. B. I. iv. 80. *M. malaccensis*, Wt. Ic. t. 1601 (2).
   W. Coast, in S. Canara (Hohenacker).
   A very slender annual herb, the leaves chiefly at or near the base.

3. Buddleia, Linn.

Trees, shrubs or herbs. *Leaves* opposite, entire, or toothed, united by a stipular line. *Flowers* in usually dense, globose or corymbose cymes, axillary or in a terminal thyrsoid panicle. *Calyx* campanulate, 4-lobed. *Corolla* urceolate or cylindric; lobes 4, short, imbricate in bud. *Stamens* 4, on the corolla-tube; anthers subsessile, ovate or oblong, cells parallel. *Ovary* 2-celled; ovules many in each cell, many-seriate; style filiform; stigma capitate, terminal or decurrent on two sides. *Fruit* a septicidally 2-valved capsule. *Seeds* very many, oblong or fusiform; testa

appressed or largely reticulate, often expanded in wings or tails; albumen fleshy; embryo straight.

BUDDLEIA ASIATICA, Lour.; F. B. I. iv. 82. *B. discolor*, Roth.; Wt. Ic. t. 894.

All forest Districts in hilly country, up to 4,000 ft., chiefly in second-growth forests, on roadsides and near villages, also on river lands and in ravines; often cultivated in gardens.

A large evergreen shrub with white fragrant flowers in terminal panicles and lanceolate leaves white-tomentose beneath. Bark thin, grey; wood grey, moderately hard. Vern. *Hind.* Nimda.

4. Fagraea, Thunb.

Glabrous trees or shrubs, often epiphytic, sometimes scandent. *Leaves* opposite, coriaceous, entire; petioles dilated at the base or united by a stipular sheath. *Flowers* large or small, white yellowish or rarely pink, in bracteate terminal or axillary cymes, grouped in corymbs, racemes or elongate panicles. *Calyx* deeply 5-fid, the lobes thick, broad, imbricate, persistent. *Corolla*-tube long, tubular or funnel-shaped; lobes 5, broad, twisted and slightly overlapping to the right in bud. *Stamens* 5, adnate to the corolla-tube, exserted; filaments slender; anthers oblong or ovate with parallel cells. *Ovary* 2-celled or 1-celled above; ovules very many in each cell; style slender; stigma capitate. *Fruit* a 1–2-celled many-seeded pulpy berry. *Seeds* embedded in the pulp; testa crustaceous; albumen horny; embryo small, straight.

Corolla-tube over 3 in. long, dilated only near the top ...1. *zeylanica.*
Corolla-tube under 2 in. long, funnel-shaped above .....2. *obovata.*

1. FAGRAEA ZEYLANICA, Thunb.; F. B. I. iv. 83.

   W. Coast, open forests of Travancore, up to 2,000 ft., Tinnevelly.

   A small tree generally epiphytic when young, afterwards reaching 30 ft. in height, the flowers cream-coloured, the berry ovoid up to 2 in. long, the leaves obovate up to 10 in. long. Vern. *Mal.* Vallerei.

2. FAGRAEA OBOVATA, Wall.; F. B. I. iv. 83. *F. coromandelina*, Wt. Ic. t. 1316; Bedd. Fl. t. 244. *F. malabarica*, Wt. Ic. t. 1317.

W. Ghâts, in evergreen forests in all Districts, up to 5,000 ft.

A small tree, generally epiphytic when young, afterwards up to 30 ft. high, with cream-coloured large flowers, ovoid smooth berry and obovate spathulate obtuse fleshy leaves. Bark grey, smooth; wood grey, soft. Vern. *Kan.* Ginnuna; *Mal.* Omal.

5. Strychnos, Linn.

Trees or climbing shrubs with usually short clavate circinate tendrils, in some of the axils, the adjacent leaf being then often suppressed. *Leaves* opposite, usually coriaceous, with 3–5 or more ribs starting from or a little above the base; main nerves transverse joining the midrib and upper side ribs, less conspicuous. *Flowers* white or yellowish, in terminal or axillary cymes; bracts and bracteoles small. *Calyx* 5- or 4-lobed. *Corolla* salver-shaped; tube cylindric; lobes 5 or 4, valvate. *Stamens* 5 or 4 adnate to the corolla-tube; filaments short; anthers ovate or oblong, cells parallel. *Ovary* 2-celled, or 1-celled above; ovules many in each cell; style long or short; stigma capitate or obscurely 2-lobed. *Fruit* a berry, globose, indehiscent, with a hardened pericarp. *Seeds* many, or 1–2, embedded in a fleshy pulp; globose or compressed, the hilum ventral; albumen horny; embryo short, the cotyledons foliaceous; radicle terete, short.

ANALYSIS AND DESCRIPTIONS AFTER A. W. HILL IN KEW BULL. 1917, 121.

Corolla-tube short, lobes longer than the tube, glabrous or woolly-tomentose on the throat, tendrils bifid, curved and thickened :—

Leaves ovate-lanceolate, acuminate, up to 5 in. long, 2·5 in. broad, glabrous, chartaceous, 3-ribbed from a little above the base, with a slender very faint pair close to the margin, transverse nerves many, sub-parallel, under surface copper-coloured; cymes axillary, about ·8 in long, few-flowered; corolla-lobes with small tufts of hairs within

1. *aenea.*

Leaves ovate or elliptic-ovate, sometimes orbicular and cordate, cuspidate, shining, coriaceous, up to 2·5 in. long, 1·25 in. broad, minutely pubescent, triple-ribbed, transverse nerves inconspicuous; cymes paniculate, about 1 in. long, the corolla-lobes woolly within

2. *bicirrhosa.*

Corolla-tube and lobes about equal in length, the throat with woolly tomentum :—

Tree, without tendrils; leaves elliptic, acute, up to 6 in. long, 2·5 in. broad, chartaceous, quintuple-ribbed, the upper pair of ribs ·5-·7 in. above the lower, transverse nerves about 4 pairs, joining the second pair of ribs to the midrib; cymes about 1 in. in diam. from the top of previous year's wood: ovary and style glabrous .....3. *potatorum*.

Climbing shrubs with bifid thickened tendrils; ovary and style hirsute :—

Leaves ovate-elliptic, acute or acuminate, up to 4 in. long, 2 in. broad, shining, coriaceous, 3-ribbed or sub-triple-ribbed, transverse nerves many, not very distinct; cymes rather over 1 in. long, from old wood .....4. *colubrina*.

Leaves ovate or elliptic-ovate, acute, up to 4 in. long, 2 in. broad, shining, subcoriaceous, triple-ribbed, the nerves and reticulation raised; cymes under 1 in. long, in axillary clusters with slender pedicels .....5. *enticellata*.

Corolla-tube and lobes about equal in length, the lobes with a line of erect hairs within; anthers bearded at the base; ovary and style glabrous; leaves ovate, ovate-lanceolate or narrowly lanceolate, acuminate, up to 5 in. long, 2 in. broad, coriaceous, triple-ribbed, transverse nerves many; cymes axillary, short and dense.....6. *Dalzellii*.

Corolla-tube elongate, much longer than the lobes :—

Tree, without tendrils; leaves broadly ovate or orbicular, obtuse or acute, coriaceous, glabrous, up to 6 in. long, 4 in. broad, 5-ribbed, transverse nerves irregular; cymes terminal, 1-2 in. in diam., many-flowered; corolla-tube only slightly hairy near the base within 7. *Nux-vomica*.

Climbing shrub with single curved, not bifid tendrils; leaves elliptic or ovate, abruptly acuminate, shining, coriaceous, glabrous, up to 5 in. long, 2 in. broad, triple-ribbed with a small marginal looped pair, transverse nerves prominent, irregular; cymes terminal, about 1·5 in. broad, many-flowered; corolla-tube long, slightly pilose within 8. *cinnamomifolia* var. *Wightii*.

1. STRYCHNOS AENEA, A. W. Hill. *S. Rheedii*, Brandis Ind. Trees 474, *not of* F. B. I.

   W. Ghâts, Anamalais and hills of Travancore at 2,000-4,000 ft., in evergreen forest.

   A large climbing shrub with prominently reticulate leaves, the fruit said to be spherical, about 2 in. in diam.

2. STRYCHNOS BICIRRHOSA, Lesch. *S. colubrina*, C. B. Clarke in F. B. I. iv. 87, *in part*.

S. Carnatic. in Tanjore (Leschenault).

A climbing shrub with smooth minutely pubescent stems.

3. STRYCHNOS POTATORUM, Linn. f.; F. B. I. iv. 90; Roxb. Cor. Pl. t. 5; Wt. Ill. t. 156.

N. Circars, Deccan and Carnatic to S. Travancore, in deciduous forests and up to 4,000 ft. in the hills. The Clearing Nut.

A medium-sized tree which may reach 50 ft. in height. The fruit is a globose 1–2-seeded berry ·5–·7 in. in diam., and the seeds are used to clear muddy water. Bark brownish-black, corky, deeply cracked; wood white turning yellowish-grey, hard, close-grained and of curious structure, but is little used. Vern. *Hind.* Nirmali; *Ur.* Kotaki; *Tel.* Chilla; *Tam.* Tattan Kottei.

4. STRYCHNOS COLUBRINA, Linn.; F. B. I. iv. 87 *in part only.* S. *Beddomei*, C. B. Clarke; F. B. I. iv. 88 *in part.*

Carnatic, Veligonda hills of Nellore (Ramaswami); W. Coast, S. Canara to Travancore, to the lower forests of the W. Ghâts.

A large climbing shrub with smooth bark and 1–3 seeded, berry ·7 in. in diam. with crustaceous pericarp.

5. STRYCHNOS LENTICELLATA, A. W. Hill.

E. Deccan and Carnatic to S. Travancore, in hilly country and deciduous forest.

A climbing shrub with lenticellate stems, the crustaceous berry ·75 in. in diam. with 1–2 orbicular flattened seeds Vern. *Tam.* Cheru mulagu.

6. STRYCHNOS DALZELLII, C. B. Clarke; F. B. I. iv. 87.

Bababudan Hills of Mysore (Law).

A large climber with ovate leaves, the crustaceous berry ·6 in. in diam. with several discoid seeds.

Var. *lanceolaris*, A. W. Hill, leaves narrowly lanceolate, scarcely 1 in. broad. Coorg and Wynaad (Beddome).

7. STRYCHNOS NUX-VOMICA, Linn.; F. B. I. iv. 90; Roxb. Cor. Pl. t. 4; Bedd. Fl. t. 243.

N. Circars, Deccan and Carnatic, also W. Coast, in deciduous forest and up to 4,000 ft. in hilly country; common on laterite and in sandy coast forests as at Strihari Kota. The Nux vomica or Strychnine tree.

A moderate-sized or large deciduous tree with greenish-

white flowers having the scent of fenugreek and orange-red berries up to 2 in. in diam. with 3–4 flat seeds. These seeds contain strychnine and are collected and exported largely. Bark thin, dark-grey or yellowish-grey; wood white, turning yellowish-grey, hard, close-grained and of curious structure, used for various purposes. Vern. *Hind.* Kuchila; *Ur.* Kachila; *Tel.* Mushti; *Tam.* Yetti; *Mal.* Kanjerám.

8. STRYCHNOS CINNAMOMIFOLIA, Thw.; F. B. I. iv. 89 *in part.* Var. *Wightii*, A. W. Hill. *S. Bourdillonii*, Brandis Ind. Trees 474.

Deccan, forests of Kurnool and Mysore; W. Ghâts, S. Canara to Travancore in evergreen forests, up to 3,000 ft. A very large climbing shrub with simple tendrils, the berry very large, 4 in. in diam. (Bourdillon), the seeds ovoid, flattened, 1 in. long. The seeds give an alkaloid, chiefly brucine.

6. Gardneria, Wall.

Large climbing shrubs, glabrous. *Leaves* opposite, entire, the petioles connected by a stipular line. *Flowers* in axillary pedunculate cymes; bracts in pairs, bracteoles on the pedicels. *Calyx* small, deeply 4–5-lobed. *Corolla* rotate, lobes 4–5, thick, valvate in bud. *Stamens* 4–5, inserted on the corolla-tube; filaments very short; anthers oblong, subconnate, erect, the cells longitudinal. *Ovary* 2-celled; ovules 1 in each cell; style subulate; stigma shortly 2-lobed. *Fruit* a globose 2-seeded berry, the pericarp fleshy. *Seed* hemispheric, cup-shaped, with a deep inner cavity filled with the pulpy placenta; testa coriaceous; albumen fleshy; embryo small, the cotyledons flat; radicle inferior.

GARDNERIA OVATA, Wall.; F. B. I. iv. 93. *G. Wallichii*, Wt. Ic. t. 1313.

W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Travancore at 4,000–7,000 ft.; hills of Mysore.

A large climber with spirally twisting stem, the leaves elliptic acute, up to 3 in. long, the yellow flowers in trichotomous cymes of about 1–5, the berry scarlet. Bark dark brown, wood in wedges of porous tissue, radiating from the centre.

Family CII. GENTIANACEAE.

Herbs, usually glabrous and bitter, rarely shrubs. *Leaves* opposite, rarely alternate, entire, exstipulate. *Flowers* usually regular and hermaphrodite, in terminal cymes or clusters, or axillary and clustered or solitary, rarely bracteate. *Calyx* inferior, 4–7-lobed or -partite, the lobes usually imbricate in bud. *Corolla*-tube campanulate, funnel-shaped or cylindric; lobes 4–7, twisted to the right or (in *Limnanthemum*) induplicate-valvate. *Stamens* as many as the corolla-lobes and alternate with them, inserted in the corolla-tube or at its mouth; filaments linear, sometimes dilated below; anthers dehiscing longitudinally, sometimes by apical pores. *Disk* annular, or of 5 glands or none. *Ovary* of 2 carpels, 1–2-celled; ovules usually numerous; style simple; stigma entire or 2-lobed. *Fruit* a membranous capsule, septicidally 2-valved, rarely a fleshy berry. *Seeds* many, small, sometimes winged, testa membranous or crustaceous; albumen copious; embryo small.

Terrestrial herbs; leaves opposite; corolla-lobes contorted in bud :—
Ovary 2-celled; style filiform; flowers blue purple or white
1. **Exacum.**

Ovary 1-celled :—
Corolla-lobes without pits, depressions or spurs at the base :—
Corolla regular :—
Style linear :—
Flowers white, in sessile axillary clusters ..2. **Enicostemma.**
Flowers pink or white, in dichotomous cymes ..3. **Erythraea.**
Style short or none, flowers usually blue .....4. **Gentiana.**
Corolla irregular :—
Flowers yellow; stigma subentire .....5. **Hoppea.**
Flowers pink or white; stigma deeply 2-lobed ....6. **Canscora.**
Corolla-lobes with pits depressions or spurs at the base :—
Corolla-lobes with 1–2 glandular nectaries near the base
7. **Swertia.**
Corolla-lobes with pits prolonged behind into spurs ..8. **Halenia.**
Aquatic herbs; leaves alternate; corolla-lobes induplicate-valvate in bud .....9. **Limnanthemum.**

1. Exacum, Linn.

Herbs, sometimes subshrubby and much branched. *Leaves* opposite, entire, usually 3- or more-ribbed. *Flowers* in terminal

and axillary usually leafy dichasioid cymes. *Calyx* deeply 4–5-lobed, the lobes keeled winged or flat on the back. *Corolla* rotate, usually blue purple or white; tube short, globose; lobes 4–5, overlapping to the right in bud. *Stamens* 4–5, inserted on the throat of the corolla; filaments short, anthers usually oblong, dehiscing by terminal pores at length extended downwards. *Ovary* 2-celled; ovules many in each cell on large fleshy placentas adnate to the septum; style long; stigma small, subcapitate. *Fruit* a globose septicidally 2-valved capsule. *Seeds* many, minute, subcuboid, the testa granular.

Corolla large, lobes at least ·25 in. long :—

Flowers tetramerous; stems 4-angled, often slightly winged :—

Corolla-lobes ·75–1·5 in. long; calyx-lobes ovate, gradually acuminate, with a narrow dorsal wing; anthers ·4 in. long, straight; leaves ovate, acute, 5- or 7-ribbed, up to 5 in. long, 1·5 in. broad; bracts broadly ovate, acute ..... 1. *Perrottetii.*

Corolla-lobes ·75–1 in. long; calyx-lobes ovate, abruptly cuspidate acuminate with a broad rounded dorsal wing; anthers nearly ·5 in. long, curved; leaves ovate or oblong-lanceolate, acuminate, 5-ribbed, up to 5 in. long, 2 in. broad; bracts narrowly lanceolate acuminate ..... 2. *bicolor.*

Corolla-lobes ·75 in. long; calyx-lobes ovate-lanceolate, long and setaceous-acuminate with a narrow dorsal wing; anthers ·3 in. long, straight; leaves lanceolate acuminate, 5-ribbed, up to 4 in. long, ·75 in. broad; bracts narrowly lanceolate .... 3. *tetragonum.*

Flowers pentamerous :—

Stems 4-winged or 4-angled, the wings sometimes nearly obsolete towards the base :—

Tall sub-shrubby herb; cymes spreading, the pedicels recurved especially in fruit; corolla-lobes ·75 in. long, apiculate; calyx-lobes lanceolate, setaceous-acuminate, with a broad rounded dorsal wing; anthers ·2–·3 in. long, not attenuate, with a round gland at the top of the connective behind; leaves membranous, ovate-lanceolate, acuminate, 3- or 5-ribbed, up to 4 in. long, 1·25 in. broad; bracts linear-lanceolate ..... 4. *Wightianum.*

Low bushy perennial much-branched herbs; leaves small, fleshy, with thin margins, 3-ribbed; pedicels erect; anthers not glandular at the back :—

Flowers about 3, corymbose at the ends of leafy branches, pedicels ·4–·6 in. long; calyx-lobes narrowly lanceolate, ·4 in. long, the dorsal wing attenuate at base; corolla-lobes obovate,

·35 in. long; leaves lanceolate acuminate up to 3 in. long, ·5 in. broad, the tips often recurved .....5. *courtallense.*

Flowers solitary near the top of leafy branches, pedicels 1–2 in. long; calyx-lobes lanceolate, ·4 in. long, the dorsal wing semicordate at base; corolla-lobes obovate, ·5 in. long; leaves spathulate, incurved and plicate, very close, up to ·75 in. long, ·2 in. broad, the tips reflexed, the side ribs very obscure 6. *travancoricum.*

Flowers solitary in the upper leafy axils, the peduncles bracteolate; corolla-lobes elliptic-obovate, apiculate, ·7 in. long; calyx-lobes acuminate semicordate at base, strongly nerved; leaves ovate or suborbicular, acute, rounded or cordate at base, sessile and stem-clasping, up to 2·5 in. long, 2 in. broad, the margin slightly thickened, 3-ribbed .....7. *atropurpureum.*

Stems terete, only the upper parts slightly angled; calyx-lobes narrowly winged, the wings sometimes only a thickened ridge; leaves thickly coriaceous, broadly ovate, acute, sessile and stem-clasping, the margins thickened, up to 2·5 in. long, 1·5 in. broad, 5-ribbed; flowers large, in terminal leafy and bracteate corymbs; corolla-lobes obovate, narrowed below, apiculate, 1 in. long 8. *anamallayanum.*

Corolla small, lobes less than ·3 in. long; flowers tetramerous; stems 4-angled :—

Calyx-lobes with a dorsal wing :—

Dorsal wing of the calyx-lobes narrow; pedicels short, under ·5 in. long; corolla-lobes elliptic, acute, up to ·3 in. long; anthers ·15 in. long; leaves subsessile, elliptic or lanceolate, up to 2·5 in. long, ·5 in. broad, usually 3-ribbed.....9. *pedunculatum.*

Dorsal wing of the calyx-lobes broad, prominently nerved, cordate at base; pedicels long, the middle one often 1–2 in.; corolla-lobes lanceolate, ·2–·25 in. long; anthers ·1 in. long; leaves petioled, ovate, acute, up to 2·5 in. long, 1 in. broad, usually 5-ribbed 10. *petiolare.*

Calyx-lobes without a dorsal wing; anthers under .1 in. long :—

Flowers subsessile; calyx-lobes ovate, indistinctly 3-nerved; corolla-lobes ovate, ·3 in. long; leaves small, sessile, obscurely 3-ribbed, up to ·25 in. long .....11. *sessile.*

Flowers peduncled, the peduncles up to 2 in. long; calyx-lobes ovate, strongly nerved; corolla-lobes elliptic, up to ·3 in. long; leaves orbicular-ovate, up to ·25 in. in diam. .....12. *Lawii.*

1. **Exacum Perrottetii**, Griseb.; F. B. I. iv. 95; Wt. Ic. t. 1322

N. Circars, Mahendragiri Hill in Ganjam 4,000–4,500 ft. (Fischer and Gage); Deccan, hills of Mysore; Carnatic, Shevaroy Hills of Salem at 4,500 ft. (Beddome); W. Ghâts, Nilgiris, chiefly about Coonoor and Kotagiri, at 6,000 ft., in grass.

An erect herb, reaching 2 ft. high, sometimes more, the flowers rose-coloured or blue, very handsome.

2. EXACUM BICOLOR, Roxb.; F. B. I. iv. 96; Wt. Ic. t. 1321.

N. Circars, Sukmamri Hill in Godavari, 3,000 ft. (Gamble); Deccan, in Mysore and Coimbatore, in hilly country; W. Ghâts, most Districts, at 4,000–6,000 ft., in grassy pastures.

An erect herb, about 2 ft. high, the corolla-lobes generally white in the lower, bright blue in the upper half. The size of the leaves is variable according to locality and soil.

3. EXACUM TETRAGONUM, Roxb.; F. B. I. iv. 95.

N. Circars, Rampa Hills of Godavari (V. Narayanswami).

An erect herb about 2 ft. high with azure blue flowers.

4. EXACUM WIGHTIANUM, Arn.; F. B. I. iv. 97; Wt. Ic. t. 840.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, at 5,000–7,000 ft.

An erect herb up to 3 ft. high, the corolla bright blue, the flowers and especially the capsule prominently curved downwards.

5. EXACUM COURTALLENSE, Arn.; F. B. I. iv. 97; Wt. Ic. t. 1323.

W. Ghâts, Courtallum in Tinnevelly (Wight).

A very pretty bushy perennial herb with many deep blue flowers and fleshy leaves.

Var. *laxiflorum*, Gamble. Flowers in lax leafy cymes, leaves longer and more acuminate, calyx-lobes much nerved, especially in fruit.

Travancore Hills (Beddome).

6. EXACUM TRAVANCORICUM, Bedd. Ic. t. 118. *E. courtallense*, Arn. var. *travancorica*, C. B. Clarke; F. B. I. iv. 97.

W. Ghâts, hills of Travancore at 4,500 ft. (Beddome), Agastiamalai Peak (Barber), in grassy places and on rocks.

An erect perennial herb with solitary cobalt-blue flowers on long peduncles near the ends of small closely packed

fleshy leaves, the whole forming a globular bush about 8 in. high.

EXACUM ATROPURPUREUM, Bedd. Ic. t. 119; F. B. I. iv. 97.

W. Ghâts, hills of Tinnevelly and Travancore, at 3,000–5,000 ft., in grass land.

An erect herb with very deep blue flowers and ovate leaves in distichous pairs.

Var. *palghatense*, Gamble. Stems winged on the angles; flowers in elongate terminal corymbs, the upper pairs of leaves becoming small and bract-like, the calyx-lobes much narrower.

Palghât Hills at 6,000 ft. (Beddome), Poonachi, Anamalais, at 5,000 ft. (Barber).

8. EXACUM ANAMALLAYANUM, Bedd. Ic. t. 154. *E. atropurpureum*, Bedd. var. *anamallayanum*, C. B. Clarke; F. B. I. iv. 97. *E. Saulierei*, Dunn in Kew Bull. 1914, 30.

W. Ghâts, Anamalais and Pulney Hills, at 6,000–7,000 ft.

A shrubby perennial herb reaching 2–3 ft. high with deep blue (the deepest ultramarine, *Bedd.*) flowers and leathery leaves, said by Beddome to be the "most lovely species of the genus."

9. EXACUM PEDUNCULATUM, Linn.; F. B. I. iv. 97; Wt. Ic. t. 336.

All plains Districts and up to about 3,000 ft. in the hills, in grass lands and moist places.

An erect annual reaching 12–18 in. high, with blue or lilac flowers.

10. EXACUM PETIOLARE, Griseb.; F. B. I. iv. 98; Wt. Ic. t. 1324 (2).

W. Ghâts, hills of Mysore, Nilgiris, Anamalais and Cochin, at 1,500–4,000 ft.

An erect slender annual, up to 12 in. high, with white or pale blue flowers.

11. EXACUM SESSILE, Linn.; F. B. I. iv. 98; Wt. Ic. t. 1324 (1).

W. Coast and W. Ghâts, in most Districts up to 4,000 ft.

A small annual herb with blue flowers reaching about 6 in. in height. Hill specimens are much more slender than those from near the coast.

12. EXACUM LAWII, C. B. Clarke; F. B. I. iv. 98.

Bababudan hills of Mysore (Law).

A small erect slender herb with rather large purplish blue flowers.

Small specimens collected by C. E. C. Fischer in the Anamalai Hills at 4,000 ft. seem to belong to *E. pumilum*, Griseb.; F. B. I. iv. 98; Wt. Ic. t. 1324 (3).

2. Enicostemma, Blume.

Erect or procumbent branching herbs. *Leaves* opposite, sessile. *Flowers* small, in sessile axillary clusters. *Calyx* deeply 5-lobed. *Corolla*-tube long, tubular below, funnel-shaped above; lobes 5, small, overlapping to the right in bud. *Stamens* 5, inserted at the middle of the corolla-tube; filaments filiform with a small double-hooded scale at the base; anthers erect, acute, included. *Ovary* 1-celled, placentas little intruded; ovules many; style short; stigma capitate. *Fruit* an ellipsoid capsule, septicidally 2-valved, the valves separating. *Seeds* many, subglobose, reticulate.

ENICOSTEMMA LITTORALE, Blume; F. B. I. iv. 101. *Adenema hyssopifolium*, G. Don; Wt. Ic. t. 600.

All plains Districts and to 1,500 ft. in the hills, chiefly however near the sea, often on black cotton soil.

A perennial herb from a thick rootstock, with many erect or procumbent branches, bearing narrow linear or linear-oblong leaves, very variable, 3-ribbed, up to 2·3 in. long and about ·5 in. broad. Flowers white, in dense clusters on the stem. An infusion of the plant is used as a tonic like gentian. Vern. *Tam.* Vellaragu.

3. Erythraea, Renealm.

Annual or perennial erect branching herbs. *Leaves* opposite, sessile. *Flowers* pink or white or sometimes yellow, in dichotomous often corymbose cymes. *Calyx* tubular, 4- or 5-lobed, the lobes keeled. *Corolla*-tube long or short, lobes 5, rarely 4, spreading. *Stamens* 5, rarely 4, inserted near the throat of the corolla-tube; filaments short, linear; anthers oblong, often spirally twisted, exserted. *Ovary* 1-celled, the placentas much intruded; ovules many; style linear; stigma 2-lobed. *Fruit* an oblong capsule almost 2-celled, septicidally 2-valved. *Seeds* minute, reticulate.

ERYTHRAEA ROXBURGHII, G. Don; F. B. I. iv. 102; Wt. Ic. t. 1325.

Most plains Districts, in cultivated fields and on grass lands.

An erect herb reaching 8 in. in height, the flowers rose-

coloured or white (Wight), the radical leaves spathulate, the stem ones linear, the flowers in good specimens in long-pedicelled dichasia, the capsules often ·3 in. long.

4. Gentiana, Linn.

Annual or perennial herbs, sometimes woody below. *Leaves* opposite, often connate at base. *Flowers* blue, yellow or white, axillary or terminal, usually sessile. *Calyx* tubular, terete or rarely keeled, sometimes spathaceous; lobes 5 or 4. *Corolla* tubular campanulate funnel-shaped or subrotate; lobes 5–4, often with folds between the lobes. *Stamens* 5 or 4, attached at or below the middle of the tube, included; filaments linear, somewhat flattened below; anthers oblong or ovate. *Ovary* 1-celled, placentas slightly intruded; ovules many; style usually short; stigma bilobed. *Fruit* a stalked or sessile, oblong or ellipsoid capsule, dehiscing septicidally. *Seeds* many, small, the testa reticulate.

Stems short; basal leaves in rosette and near above it much larger than the stem leaves, ovate or spathulate, often reaching 1–1·5 in. long, stem leaves gradually smaller, often very small, usually lanceolate, recurved; capsule-stalk not longer than the calyx-lobes, ·25 in. long

1. *pedicellata* var. *Wightii.*

Stems elongate; basal leaves not larger than the stem leaves, often even smaller, usually under ·3 in. long, both ovate or obovate; capsule-stalk longer than the calyx-lobes, often ·5 in. long

2. *quadrifaria* var. *zeylanica.*

1. GENTIANA PEDICELLATA, Wall. *G. quadrifaria*, C. B. Clarke; F. B. I. iv. 111 *in part.*

Var. *Wightii*, Kusnezow Acta Hort. Petrop. xv. 401. . *G. pedicellata*, Wt. Ic. t. 1328, Spic. Neilg. t. 164.

W. Ghâts, Nilgiris, Anamalai and Pulney Hills and hills of Tinnevelly, above 6,000 ft., in pasture lands.

A tufted herb with bright pale blue flowers.

2. GENTIANA QUADRIFARIA, Bl.; F. B. I. iv. 111 *in part.*

Var. *zeylanica*, Kusnezow Acta Hort. Petrop. xv. 403.

Bababudan Hills of Mysore, about 6,000 ft.

An erect herb, little branching, with blue flowers.

5. Hoppea, Willd.

Small, much-branched glabrous herbs. *Leaves* opposite, small, sessile. *Flowers* sessile or short-pedicelled, in 2–3-chotomous

cymes, small. *Calyx* campanulate, membranous; lobes 4, lanceolate. *Corolla* tubular; lobes 4, more or less unequal. *Stamens* inserted in the throat of the corolla, 1 perfect, 3 barren or wanting; filament linear, short; anther ovate, with parallel cells. *Ovary* 1-celled, placentas little intruded; style short, stigma 2-lobed. *Fruit* a globose or ellipsoid capsule, septicidally 2-valved. *Seeds* very many, minute, obscurely reticulate.

Stem 4-angled; calyx-lobes scarious with green marginal nerves; corolla shorter than the calyx; capsule globose .....1. *dichotoma*.
Stem 4-winged; calyx-lobes scarious with slender marginal nerves; corolla longer than the calyx; capsule ellipsoid .....2. *fastigiata*.

1. HOPPEA DICHOTOMA, Willd.; F. B. I. iv. 100.
   N. Circars and Deccan in grass, as far south as Salem and Chingleput.
   A small herb, up to about 6 in. high, with pale yellow flowers.
2. HOPPEA FASTIGIATA, C. B. Clarke; F. B. I. iv. 100.
   N. Circars, in Ganjam (Gamble); Deccan, in Mysore; W. Coast from S. Canara to Travancore.
   A small herb, up to about 6 in. high, with pale yellow flowers.

6. Canscora, Lamk.

Annual dichotomously branched herbs. *Leaves* opposite, sessile, petiolate or perfoliate. *Flowers* pink or white, in lax terminal dichasioid cymes, or axillary or spicate; bracts leafy or subulate, sometimes perfoliate. *Calyx* tubular, 4-toothed; tube terete and striate, keeled or winged. *Corolla*-tube cylindric, usually very thin and membranous; lobes 4, more or less unequal, imbricate and overlapping to the right in bud. *Stamens* 4, inserted on the corolla-tube, 1 or 2 with longer filaments and larger fertile anthers, 3 or 2 with shorter filaments which are usually sterile. *Ovary* 1-celled, placentas slightly intruded; ovules many; style filiform; stigma deeply 2-lobed. *Fruit* a cylindric membranous capsule, septicidally 2-valved. *Seeds* very small, angular, brown, reticulate.

Bracts at the branches of the inflorescence not perfoliate :—
  Calyx not winged :—
    Stems 4-angled, leaves, lower elliptic petioled, upper ovate-lanceolate, passing gradually into ovate acute, sometimes nearly linear, sessile,

membranous bracts at the bifurcations of the inflorescence; pedicels filiform, usually under ·5 in. long; calyx-teeth setaceous 1. *diffusa*.

Stems 4-winged :—

Pedicels slender, at least ·5 in. long, angular :—

Pedicels not enlarged below the calyx; lower leaves oblong-lanceolate or -elliptic, attenuate at base, upper ovate-lanceolate; panicles many-flowered .....2. *decurrens*.

Pedicels more or less enlarged below the calyx; lower leaves ovate obtuse, upper ovate acute; panicles few-flowered 3. *pauciflora*.

Pedicels of central flower 0, of others short and winged or 0; stem-wings prominent, continued into the inflorescence; leaves ovate, obtuse or subacute, sessile, up to ·75 in. long, ·4 in. broad 4. *sessiliflora*.

Calyx prominently winged, the wings narrow, reticulate; stems narrowly 4-winged, also the pedicels, the wings broader at the top; leaves ovate or lanceolate, acute, sessile, up to 2 in. long, ·75 in. broad, prominently 3-nerved .....5. *decussata*.

Bracts at the branches of the inflorescence perfoliate :—

Calyx prominently winged, the wings broad and reticulate; stems 4-winged, the wings of the short pedicels gradually widening to those of the calyx; leaves lanceolate, acute or acuminate, sessile, up to 1·5 in. long, ·6 in. broad .....6. *perfoliata*.

Calyx not winged, striate; stems narrowly 4-winged, the pedicels filiform; leaves lanceolate, acute, sessile, up to 1·25 in. long, ·5 in. broad .....7. *Wallichii*.

1. CANSCORA DIFFUSA, R. Br.; F. B. I. iv. 103. *C. Lawii*, Wt. Ic. t. 1327 (1). *Pladera virgata*, Roxb.; Hook. Bot. Misc. iii. 88, t. 25.

All Forest Districts, in ravines, on wet banks, sides of watercourses, etc., common.

A very pretty slender annual herb with pink flowers and leaf-like bracts to the forks of the branches of the panicle.

2. CANSCORA DECURRENS, Dalz.; F. B. I. iv. 103.

N. Circars, hills of Godavari; Deccan, in hilly country, Kurnool to Coimbatore; W. Coast and W. Ghâts, at low levels, often in rice-fields.

A slender erect herb with pink or sometimes white flowers.

3. CANSCORA PAUCIFLORA, Dalz.; F. B. I. iv. 103.

W. Coast, S. Canara to Travancore, in grassy places (Dalzell).

A slender erect herb, scarcely separable from *C. decurrens*, at any rate in dry specimens.

4. CANSCORA SESSILIFLORA, Roem. & Sch.; F. B. I. iv. 104.
N. Circars and Carnatic, westwards to the foot of the Madura Hills, in moist places.
An erect herb reaching 18 in. in height, but usually much less, the flowers rose-coloured.

5. CANSCORA DECUSSATA, Roem. & Sch.; F. B I. iv. 104.
All plains Districts and up to 3,000 ft. in the hills.
An erect herb reaching 20 in. in height, the flowers white.

6. CANSCORA PERFOLIATA, Lamk.; F. B. I. iv. 104. *C. grandiflora*, Wt. Ic. t. 1326.
W. Ghâts, from S. Canara and Mysore to the Anamalais and the hills of Travancore, up to 3,500 ft., on the western side.
An erect herb reaching 18 in. in height, the flowers rose-coloured.

7. CANSCORA WALLICHII, C. B. Clarke, F. B. I. iv. 105. *C. perfoliata*, Wt. Ic. t. 1327 (2), *not of* Linn.
Carnatic, Kambakam Drúg in Chingleput (Bourne); W. Ghâts, Nilgiris to Travancore, in grass lands, up to 5,000 ft.
An erect herb reaching 16 in. in height, the flowers rose-coloured.

7. Swertia, Linn.

Annual or perennial herbs. *Leaves* usually opposite. *Flowers* blue lurid or white, sometimes with yellow nectaries, in terminal panicled or corymbose cymes. *Calyx* deeply 4–5-partite; tube 0 or very short; lobes linear or lanceolate, sometimes ovate. *Corolla* rotate; lobes 4–5, overlapping and twisted to the right in bud, each lobe (or the tube below it) having near the base 1 or 2 glandular nectaries naked or covered by a thin scale. *Stamens* 4–5 inserted at the base of the corolla, free or slightly joined in a ring; filaments linear, often dilated downwards; anthers oblong, versatile. *Ovary* 1-celled, the placentas slightly intruded; ovules many; style short or 0; stigma bilobed. *Fruit* a sessile, ovate or oblong, 2-valved capsule. *Seeds* usually many, small; testa reticulate.

Nectaries 2 near the base of each corolla-lobe; stigma sessile, broad; small herbs under 10 in. in height ..... 1. *minor*.

Nectary 1 near the base of each corolla-lobe, a pit with or without a covering scale; style short or 0; herbs exceeding 10 in. in height:—

Inflorescence elongate, paniculate:—

Corolla-lobes obtuse, sometimes apiculate, ·2–·3 in. long, nectary a pit with fimbriate margin covered with a large ciliate scale; style 0; leaves lanceolate or linear-lanceolate, up to about 3 in. long, ·5 in. broad .....2. *angustifolia* var. *pulchella*.

Corolla-lobes acuminate, ·4–·5 in. long, nectary a round pit with long-ciliate edges; style very short; leaves elliptic-lanceolate, acuminate, up to 3 in. long, 1 in. broad .....3. *trichotoma*.

Inflorescence corymbose:—

Flower cymules at the ends of the inflorescence branches dense:—

Nectary near the base of the corolla-lobe covered with a fimbriate scale; corolla-lobes elliptic-obovate, usually apiculate, ·3–·4 in. long; calyx-lobes narrowly lanceolate; leaves elliptic or spathulate or linear-oblong, almost obtuse, up to 1.5 in. long, ·5–·75 in. broad .....4. *corymbosa*.

Nectary not covered with a scale, the margins fringed; corolla-lobes elliptic, obtuse or mucronate only, ·25 in. long; calyx-lobes ovate; leaves broadly ovate to nearly orbicular, obtuse, up to 1 in. long, ·75 in. broad .....5. *Beddomei*.

Flower cymules at the ends of the inflorescence branches lax; nectary large, ciliate, covered with a fimbriate scale; corolla-lobes obovate, mucronate, ·4 in. long; calyx-lobes narrowly lanceolate; leaves deltoid-ovate, up to 2 in. long, ·7 in. broad .....6. *Lawii*.

SWERTIA MINOR, Knobl. Bot. Cent.-Blatt lx. 321. *Pleurogyne ? minor*, Benth.; F. B. I. iv. 120. *Ophelia minor*, Griesb.; Wt. Ic. t. 1332.

W. Ghâts, Nilgiris, above 6,000 ft., in wet places on grass lands.

A small erect herb with white or blue flowers, small ovate sessile leaves and flowers in leafy fastigiate panicled cymes, the nectaries with usually ciliate scales.

2. SWERTIA ANGUSTIFOLIA, Buch.-Ham.; F. B. I. iv. 125.

Var. *pulchella*, Burkill in Journ. As. Soc. Beng. (New Series) ii. 8. 375. *S. pulchella*, Ham.; F. B. I. iv. 125. *S. affinis*, C. B. Clarke; F. B. I. iv. 126. *Ophelia elegans*, Wt. Ic. t. 331.

N. Circars, hills of Ganjam to Godavari, to 4,500 ft. on Mahendragiri; Deccan, hills of Kurnool; W. Ghâts, from the Nilgiris southwards, at 2,000–6,000 ft.

An erect herb reaching 3 ft. in height, the flowers white with blue spots. Said to afford a medicinal bitter.

3. SWERTIA TRICHOTOMA, Wall.; F. B. I. iv. 126.
W. Ghâts, Nilgiris, above 7,000 ft.
A tall leafy herb with pale blue flowers, the corolla- and long calyx-lobes prominently acuminate or caudate, the upper cyme-branches often in umbels.

4. SWERTIA CORYMBOSA, Wt.; F. B. I. iv. 126. *Ophelia corymbosa*, Wt. Ic. t. 1329, Spic. Neilg. t. 165.
W. Ghâts, hills of Mysore, Coimbatore, Nilgiris and Malabar, above 5,000 ft.
An erect herb reaching about 20 in. in height, with long branches, the flowers white or pale blue with blue nerves. Sometimes the upper pedicels are in umbels.

Var. *Grisebachiana*, C. B. Clarke. *Ophelia Grisebachiana*, Wt. Ic. t. 1330.
W. Ghâts, Anamalai and Pulney Hills, above 6,000 ft.
Leaves linear-oblong, nearly spathulate when young; flowers rather larger and corolla-lobes more acuminate.

5. SWERTIA BEDDOMEI, C. B. Clarke; F. B. I. iv. 127.
W. Ghâts, S. Canara to Travancore (Beddome); Nilgiris at Sispara 6,700 ft. (Lawson, Gamble).
An erect herb with rather small flowers in a close flat-topped corymb, the leaves distichous, the calyx-lobes ovate, acute.

6. SWERTIA LAWII, Burkill. *S. corymbosa* var. *Lawii*, C. B. Clarke; F. B. I. iv. 126.
W. Ghâts, Brahmagiri and Bababudan Hills of Mysore, about 4,000 ft.
A tall herb reaching 2–3 ft. high with white flowers with blue nerves.

8. Halenia, Borkh.

Erect herbs, annual or perennial. *Leaves* opposite, usually ribbed. *Flowers* in axillary leafy cymes, the end one often umbelliform, the whole making a lax panicle. *Calyx* 4–5-partite, the lobes sometimes with small glands at the base within. *Corolla* campanulate, 4–5-lobed, pitted near the base, within the pits produced in curved spurs which protrude between the calyx-lobes. *Stamens* 4–5, attached near the base of the corolla; filaments

linear; anthers ovate. *Ovary* 1-celled; ovules many, attached to the sutures; style slender; stigmas 2, oblong or linear. *Fruit* a capsule, dehiscing septicidally in the upper part. *Seeds* ellipsoid, smooth, albuminous; embryo minute with minute cotyledons.

HALENIA PERROTTETII, Griseb.: F. B. I. iv. 130; Wt. Ill. t. 157, Ic. t. 1334.

W. Ghâts, Nilgiris and Pulneys, above 6,000 ft., on the margins of sholas and in long grass.

An erect herb reaching 2–3 ft. in height with pale blue (white with purple edges, *Bourne*) flowers and ovate 5-ribbed leaves.

9. Limnanthemum, S. P. Gmel.

Aquatic herbs, floating or creeping; stems erect or runner-like or resembling petioles. *Leaves* alternate or subopposite, orbicular elliptic or ovate, deeply cordate, entire or obscurely sinuate. *Flowers* white or yellow, on peduncles clustered at the nodes or on the apparent petioles close below the leaf-blades. *Calyx* 4–7-partite, the lobes oblong or lanceolate. *Corolla* subrotate; tube sometimes glandular opposite the lobes; lobes 4–7, induplicate-valvate in bud, ciliate fimbriate or folded. *Stamens* 4–7, adnate to the corolla-tube; filaments short, anthers hastate-oblong, versatile. *Ovary* 1-celled; placentas 2, parietal; style short or long; stigma 2-lobed. *Fruit* a globose ovoid or ellipsoid capsule, indehiscent or bursting irregularly. *Seeds* many, discoid, smooth or tuberculate, sometimes winged, albuminous; cotyledons very small, radicle cylindric.

Stems petiole-like with a single floating leaf at the end node and there rooting; leaves orbicular, deeply cordate; flowers white, yellow towards the base within :—

Corolla-lobes entire, with a longitudinal fold down the middle and glands below it on the tube, white; seeds few, rather large with prominent small tubercles ..... 1. *cristatum.*

Corolla-lobes long fimbriate, not folded down the middle, white with yellow centre; seeds very many, small, smooth, or with a few small tubercles ..... 2. *indicum*

Stems with spathulate-orbicular radical leaves, and petiole-like orbicular cordate, membranous cauline ones, floating, not rooting at the nodes; corolla white, small, with 4–5 fimbriate lobes; seeds minutely tuberculate, lenticular ..... 3. *parvifolium.*

Stems with several nodes and alternate leaves, all orbicular and deeply cordate; corolla yellow with lobes fimbriate on the margin; seeds puberulous and minutely reticulate, almost spherical . . 4. *aurantiacum*.

1. LIMNANTHEMUM CRISTATUM, Griseb.; F. B. I. iv. 131. *Menyanthes cristata*, Roxb. Cor. Pl. t. 105.
   All plains Districts, in tanks and ponds and ditches, common.
   A rather small plant, the orbicular deeply cordate, often purplish floating leaves up to 4 in. in diam., the pedicels short, the seeds few only, less than 10, rather large, usually about 7, the tubercles slightly glochidiate.
2. LIMNANTHEMUM INDICUM, Thw.; F. B. I. iv. 131.
   All plains Districts, in tanks and ponds and ditches, less common.
   A large plant, the orbicular floating leaves up to 12 in. in diam., the pedicels long, the seeds usually very many and small.
3. LIMNANTHEMUM PARVIFOLIUM, Griseb.; F. B. I. iv. 132.
   W. Coast, backwaters at Quilon, Travancore (Wight).
   A delicate plant with many radical leaves and very long slender stems with small floating leaves under 1 in. in diam.; seeds not many.
4. LIMNANTHEMUM AURANTIACUM, Dalz.; F B. I. iv. 132.
   Deccan, in Mysore (Meebold); W. Coast.
   A straggling plant with elongate stems bearing leaves and flowers at intervals; the minutely puberulous seeds are characteristic as well as the yellow flowers.

Family CIII. HYDROPHYLLACEAE.

Annual or perennial herbs, rarely shrubs. *Leaves* radical or alternate, rarely opposite, exstipulate. *Flowers* regular, hermaphrodite, usually in scorpioid cymes, sometimes in spikes or racemes. *Calyx* inferior, 5-partite. *Corolla* 5-lobed, the lobes imbricate, rarely contorted. *Stamens* 5, inserted on the corolla-tube and alternate with its lobes; filaments filiform; anthers ovate-oblong or linear, versatile. *Disk* hypogynous, inconspicuous or 0. *Ovary* superior, 1–2-celled; ovules 2–many in each cell; styles 1 or 2; stigmas capitate. *Fruit* a globose or ovoid,

loculicidal or septicidal, 2-valved capsule or dehiscing irregularly. *Seeds* minute, albumen fleshy; embryo minute.

Hydrolea, Linn.

Herbs, rarely undershrubs. *Leaves* alternate, entire. *Flowers* blue, in short terminal racemes or cymes. *Calyx* 5-partite, lobes lanceolate. *Corolla* rotate or campanulate, 5-lobed. *Stamens* 5; filaments filiform, sometimes dilated at base; anthers sagittate. *Ovary* 2-celled, with fleshy placentas adnate to the dissepiment; ovules many; styles 2, distinct; stigmas capitate. *Fruit* a globose or ovoid septicidal capsule. *Seeds* minute, irregularly wrinkled.

HYDROLEA ZEYLANICA, Vahl; F. B. I. iv. 133; Wt. Ic. t. 601.
All plains Districts, in wet places, rice-fields and on the margins of tanks and watercourses, common.
An annual herb, rooting at the nodes, with bright blue flowers and lanceolate leaves, the calyx glandular pubescent, the capsule thin and transparent.

Family CIV. BORAGINACEAE.

Herbs, shrubs or trees, rarely climbers, often hispid or scabrous. *Leaves* alternate, rarely opposite; stipules 0. *Flowers* regular, hermaphrodite or rarely polygamous, usually in scorpioid cymes, sometimes in 3-chotomous panicles, rarely solitary and axillary; bracts leafy, small or 0. *Calyx* inferior, 5- rarely 6–8-lobed, usually persistent and often accrescent in fruit. *Corolla* gamopetalous, usually 5-lobed, often with scales in the throat; lobes imbricate in bud, rarely twisted. *Stamens* as many as the corolla-lobes, alternate with them, on the corolla-tube; anthers ovate oblong or linear, the cells dehiscing introrsely or laterally. *Ovary* superior, 2-celled with 2 ovules in each cell or 4-celled with 1 ovule; style terminal or gynobasic, simple or forked; stigmas capitate or 2-lobed; ovules suberect from the inner angle of each cell. *Fruit* a drupe or dividing into 2–4 nutlets. *Seeds* erect or oblique; testa membranous; albumen fleshy or 0; embryo straight or curved; radicle superior.

Ovary entire or slightly 4-lobed; style terminal:—
Style twice bipartite; calyx with short teeth accrescent in fruit;

drupe 1–4-celled; albumen 0; cotyledons plicate longitudinally; trees or shrubs .....1. **Cordia.**

Style once forked or styles 2 :—

Style usually bipartite; drupe with 2 2-seeded or 4 1-seeded pyrenes; trees or shrubs .....2. **Ehretia.**

Styles 2; drupe of 4 1-seeded pyrenes; prostrate herbs **3. Coldenia.**

Style 1, simple; drupe of 4 1-seeded pyrenes; virgate shrub **4. Rotula.**

Style depressed-conical at the apex or with a horizontal ring below the stigma :—

Style short, shortly 2-lobed; pyrenes 2 2-seeded; shrubs, often scandent .....5. **Tournefortia.**

Style elongated, dilated above, usually in a ring; pyrenes 4 1-seeded; herbs or undershrubs .....6. **Heliotropium.**

Ovary deeply 4-lobed; fruit of usually 4 nutlets, attached to a carpophore :—

Style subterminal; carpophore pyramidal, excavated to hold the nutlets; anthers connivent in a cone, the connectives produced; fruiting calyx enlarged; herbs .....7. **Trichodesma.**

Style gynobasic; carpophore conical; nutlets glochidiate :—

Nutlets not or slightly margined, flattened around the carpophore **8. Cynoglossum.**

Nutlets prominently margined, the margins recurved, conically attached to the carpophore .....9. **Paracaryum.**

1. Cordia, Linn.

Trees or shrubs, sometimes subscandent. *Leaves* alternate or subopposite, petioled, entire or toothed. *Flowers* polygamous, ♂ and ☿ in dichotomous corymbose cymes or clusters; bracts 0. *Calyx* tubular or campanulate, accrescent in fruit; teeth short, often irregular or obscure. *Corolla* funnel- or salver-shaped or campanulate, usually white; lobes 4–8, spreading or reflexed, imbricate. *Stamens* as many as the corolla-lobes, adnate to the tube; the filaments often hairy at the base; anthers sagittate or hastate, usually exserted. *Ovary* 4-celled, ovules solitary in each cell; style terminal, simple below, then 2-partite, the branches again bipartite; stigmas capitate or clavate. *Fruit* an ovoid or ellipsoid drupe with viscid pulp, putamen 1–4-celled but only 1 cell usually with a fertile seed. *Seeds* exalbuminous; cotyledons plicate; radicle short.

Flowers white :—

Corolla small, tube hardly as long as the calyx :—

Leaves alternate or occasionally subopposite, usually with at least the basal pair of nerves opposite :—

Filaments villous at the base :—

Margins of the fruiting calyx not recurved :—

Fruiting calyx not ribbed; leaves usually without conspicuous cystoliths on the upper surface, penninerved but the lowest pair usually opposite; ♂ flowers usually larger than ♀; drupe ovoid :—

Leaves not tomentose beneath, sometimes villous, especially in the axils of the nerves, variable in shape but usually ovate to suborbicular, shortly and obtusely acute at apex, obtuse or cuneate at base, often repand-crenate, up to 5 in. in diam., the petiole 1·5 in.; flowers moderate sized in lax cymes, usually shortly peduncled, 1–2 in.

1. *obliqua.*

Leaves softly fulvous- or white-tomentose beneath, ovate-orbicular, truncate or cordate at base, obtuse or slightly acute at apex, up to 6 in. in diam., the petiole 2 in.; flowers rather large in lax cymes, usually long-peduncled, up to 4 in. ..... 2. *Wallichii.*

Fruiting calyx ribbed :—

Leaves large, ovate, cordate, obtuse, crenate-dentate, at first smooth above, later very rough and wrinkled with impressed nerves and with prominent cystoliths, densely tomentose beneath with white or tawny wool, up to 6 in. in diam.; flowers rather large, especially the ♂, in rather short terminal or axillary corymbs; drupe ovoid, acute, half enclosed in the ribbed cup-shaped calyx

3. *Macleodii.*

Leaves small, ovate, subacute at apex, rounded at base, repand, up to 2 in. long, 1 in. broad, when young closely grey-tomentose; flowers in few-flowered small terminal corymbs; drupe ovoid, rostrate-acuminate, ·75 in. long, seated on the cup-shaped ribbed calyx ..... 4. *domestica.*

Margin of the fruiting calyx strongly recurved, the calyx ribbed, the drupe large, up to 1 in. long; leaves variable, ovate rhomboid or broadly oblong, obtuse but often abruptly apiculate at apex, cuneate at base, upper surface with white cystoliths, lower fulvous or grey-tomentose, up to 8 in. long, 4 in. broad, the petiole 2 in.; flowers in lax usually subterminal

fulvous-tomentose cymes, the ♂ rather larger; the calyx tubular .....5. *evolutior.*

Filaments glabrous at the base; leaves ovate, obtuse or acute at apex, usually rounded at base, often subopposite, upper surface scabrous with prominent whitish points, lower villous or tomentose, sometimes nearly glabrous, up to 4 in. long, 2 in. broad; flowers in short-peduncled close corymbs, the calyx-tube cylindric; drupe ovoid acute, variable in size ..6. *monoica.*

Leaves usually subopposite, the basal pair of nerves not opposite:—

Leaves oblanceolate-oblong, obtuse, entire or undulate, upper surface dotted with white cystoliths, up to 4 in. long, 1·5 in. broad; flowers small, in lax terminal or axillary pedunculate cymes usually tetrandrous; drupe ovoid, acute, up to ·5 in. long .....7. *Rothii.*

Leaves elliptic-obovate, obtuse or emarginate, entire or subcrenate, upper surface scabrous hispid; flowers small, in few-flowered subsessile corymbs; drupe ovoid, acuminate, up to ·5 in. long 8. *Perrottetii.*

Corolla rather large, the tube longer than the calyx; leaves ovate, acuminate, entire to serrate, the basal pair of nerves opposite, up to 6 in. long, 3 in. broad, without cystoliths, nearly glabrous; flowers in lax long-peduncled terminal corymbs, the calyx-tube cylindric, ·3 in. long .....9. *octandra.*

Flowers large, orange or orange-scarlet, the corolla-tube longer than the calyx; leaves large, ovate or elliptic, rough ....*Sebestena and subcordata.*

1. CORDIA OBLIQUA, Willd.; Hutch. in Kew Bull. 1918, 221; F. B. I. iv. 137, *excl. var. C. Myxa*, Roxb.; F. B. I. iv. 136, *not of* Linn; Wt. Ill. t. 169.

All Forest Districts, in deciduous forest, common; sometimes cultivated.

A moderate-sized deciduous tree with white flowers, leaves very variable in size, and a yellow or pink ovoid glossy berry supported by the accrescent calyx and containing a mucilaginous transparent edible pulp. Bark thick, grey or brown; wood greyish-brown, moderately hard, used for various purposes. Vern. *Hind.* Lasora; *Ur.* Gondi · Tel. Iriki, Nakkeri; *Tam.* Vidi; *Can.* Challe; *Mal.* Virusham.

2. CORDIA WALLICHII, G. Don; Bedd. Fl. t. 245. *C. obliqua*, Willd., var. *Wallichii*, C. B. Clarke; F. B. I. iv. 137. *C. obliqua*, Wt. Ic. t. 1378.

W. Deccan and W. Ghâts, in deciduous forests, often with teak.

A moderate-sized tree with a useful wood.

3. CORDIA MACLEODII, Hook. f. and Th.; F. B. I. iv. 139; Brand. For. Fl. t. 41.

Deccan and Carnatic, in hilly deciduous forest up to 4,000 ft.

A deciduous tree reaching 40 ft. in height. Bark thick, grey, corky; wood light brown, mottled, very hard and handsome, useful for furniture and other ornamental work. Vern. Hind. Dhengan; *Ur.* Baurlo; *Tel.* Pedda batava.

4. CORDIA DOMESTICA, Roth. *C. Myxa* var. *domestica*, C. B. Clarke; F. B. I. iv. 137. *C. fulvosa*, Wt. Ic. t. 1380.

Kambakam Hills of Chingleput (Herb. Madras 8979).

Apparently a shrub or small tree, but well-marked by the small white-pubescent leaves, the narrow corolla-lobes, ribbed calyx and long-pointed fruit.

5. CORDIA EVOLUTIOR, Gamble n. comb. *C. fulvosa*, C. B. Clarke in F. B. I. iv. 140 with var. *evolutior*, *not of* Wt.

Deccan, Marnhalli in Mysore (Meebold); Carnatic, Melpat in S. Arcot (Barber).

A small tree with a low spreading crown, 12–15 ft. high, usually with much fulvous tomentum, and large drupe.

6. CORDIA MONOICA, Roxb. Cor. Pl. t. 58; F. B. I. iv. 137.

Deccan and Carnatic, in hilly country chiefly, W. to the E. slopes of the Ghâts.

A small tree or shrub with white flowers and a yellow fruit, the leaves variable in shape and amount of tomentum. Vern. *Tel.* Panugeri.

7. CORDIA ROTHII, Roem. & Sch.; F. B. I. iv. 138; Wt. Ic. t. 1379.

Deccan and Carnatic, in dry deciduous forests.

A small tree with white flowers and yellow or reddish-brown fruit. Bark grey or brownish-grey, with deep longitudinal furrows; wood hard, brown, streaked, useful for agricultural work and furniture. Vern. *Hind.* Gondi; *Tam.* Narvilli.

8. CORDIA PERROTTETII, Wt. Ic. t. 1381; F. B. I. iv. 138.

Deccan, chiefly on black-cotton soil as in Bellary.

A small tree.

9. CORDIA OCTANDRA, DC.; F. B. I. iv. 140. *C. serrata*, Roxb.; Wt. Ic. t. 469.

Travancore, in dry forest at about 1,000 ft.

A small tree with usually 8 stamens. Bark pale brown; wood whitish-brown, soft, used for agricultural implements. Vern. *Tam.* Potta virasu.

Cordia Sebestena, Linn. is a small tree, occasionally found in cultivation in gardens in the plains; it is a native of the W. Indies. *C. subcordata*, Lamk., is also found in Madras gardens; it is a coast plant of the Andaman Islands and Malay Peninsula, also with large orange-red flowers.

2. Ehretia, Linn.

Trees or shrubs. *Leaves* alternate. *Flowers* small, usually white, in terminal or axillary, corymbose or panicled, cymes, rarely solitary. *Calyx* small, 5-partite. *Corolla* with a short cylindric tube; lobes 5, spreading or reflexed, imbricate. *Stamens* 5, inserted on the corolla-tube, usually exserted; filaments filiform; anthers ovate or oblong. *Ovary* 2-celled with 2 ovules in each cell, or 4-celled with 1 ovule; style terminal, bifid or 2-partite or styles 2; stigma small, capitate. *Fruit* a small subglobose drupe with 4 1-celled or 2 2-celled or 1 4-celled pyrenes, 1 or more of the pyrenes or seeds frequently suppressed. *Seeds* straight, testa thin, albumen scanty; cotyledons oblong, small.

Style single, bifid less than half-way down; calyx-lobes small, oblong ovate or lanceolate, glabrous or pubescent :—

Leaves serrate, elliptic or ovate, acuminate, nearly glabrous, up to 7 in. long, 3 in. broad; flowers in subsessile fascicles on the branches of axillary or terminal panicles; calyx-lobes obtuse; drupe with 2 2-celled pyrenes without cavity ..... 1. *acuminata*.

Leaves entire; drupe with 4 pyrenes or less, the pyrenes with a cavity :—

Leaves usually more than 3 in. long, 2 in. broad :—

Flowers in axillary lateral or terminal lax cymes of unilateral spikes or racemes :—

Leaves unsymmetric, pale when dry, variable in shape, usually elliptic or elliptic-obovate, obtuse or obtusely acute at apex, cuneate at base, with about 7 pairs of strong main nerves, up to 8 in. long, 4·5 in. broad, innovations rusty-pubescent

2. *laevis*.

Leaves symmetric, dark brown to nearly black when dry, elongate-elliptic, acuminate at apex, attenuate at base, with about 6–8 pairs of strong main nerves, up to 6 in. long, 2–3 in. broad, innovations puberulous .....3. *canarensis*.

Flowers in usually terminal, sometimes axillary, hispid-pubescent corymbose cymes; leaves elliptic or ovate, obtuse or subacute, hispid-pubescent beneath, up to 4 in. long, 2 in. broad, main nerves 6–7 pairs, close and regular; drupe rather large

4. *aspera*.

Leaves usually less than 3 in. long, 2 in. broad; flowers in rather close terminal or axillary corymbs:—

Leaves elliptic or obovate, obtuse at apex but sometimes minutely apiculate, nearly glabrous, up to 2.5 in. long, 1·25 in. broad, the main nerves 4–5 pairs; corymbs lax, the flowers rather large; calyx ·1 in. long, lanceolate, nearly or quite glabrous, as long as the corolla-tube .....5. *ovalifolia*.

Leaves elliptic-lanceolate or -oblanceolate, acute at apex, long attenuate at base, glabrous, up to 2 in. long, ·75 in. broad, main nerves 4–6 pairs, oblique; corymbs mostly terminal and rather dense, the flowers small; calyx about ·5 in. long, shorter than the corolla-tube .....6. *Wightiana*.

Leaves ovate, scabrous-pubescent, as are the branchlets and inflorescence, obtuse at apex with a small apiculus, narrowed or rounded at base, up to 2 in. long, 1 in. broad, the main nerves irregular, about 4 pairs; corymbs small, few-flowered; calyx-lobes lanceolate, scabrous, as long as the corolla-tube

7. *pubescens*.

Styles 2 or 1 slender and bifid to near the base; calyx-lobes large, spathulate, with white bristles; leaves fascicled, coriaceous, obovate, cuneate at base, rounded and often 3–5-lobed at apex, densely covered on the upper surface with large white glands each with a bristle, up to 1 in. long, ·3 in. broad; corolla campanulate with obtuse spreading lobes; filaments slender; drupe with 1 4–5-celled pyrene .....8. *microphylla*.

1. EHRETIA ACUMINATA, R. Br.; F. B. I. iv. 141. *E. serrata*, Roxb.; Wt. Ill. t. 170.

N. Circars, hills of Vizagapatam, at 3,000–3,500 ft. (A. W. Lushington).

A moderate-sized tree with white flowers. Bark grey, longitudinally fissured; wood light brown, moderately hard, resembling that of the ash, useful. Vern. *Hind.* Panyan.

2. EHRETIA LAEVIS, Roxb. Cor. Pl. t. 55; F. B. I. iv. 141; Brand. For. Fl. t. 42.

   N. Circars and Deccan, in deciduous forests, in the hills to about 2,000 ft., more scarce in the Carnatic.

   A moderate-sized or small deciduous tree with pale grey branches, white flowers in conspicuous cymes often terminal and orange-scarlet fruit turning black. Bark grey; wood greyish-white, even-grained and tough. Vern. *Hind.* Chamror; *Ur.* Mosonea; *Tel.* Paldatam.

3. EHRETIA CANARENSIS, Miq. in Pl. Hohenack. No. 285. *E. laevis*, Roxb., var. *canarénsis*, C. B. Clarke; F. B. I. iv. 141. *E. laevis*, Wt. Ic. t. 1382; Bedd. Fl. t. 246, *not of* Roxb.

   W. Ghâts, in all Districts, up to about 3,000 ft.

   A small tree with brownish-grey branches and white flowers, in small usually axillary cymes. Wood greyish or brownish-white. Vern. *Mal.* Chavandi

4. EHRETIA ASPERA, Willd. Phyt. 4. t. 2. fig. 1; Roxb. Cor. Pl. t. 55. *E. laevis*, Roxb., var. *aspera*, C. B. Clarke; F. B. I. iv. 142.

   Carnatic, in dry places near Negapatam, west to Coimbatore, north to Vizagapatam.

   A small tree with brown branches and hispid-pubescent leaves and inflorescence. Vern. *Tel.* Tella juvi.

5. EHRETIA OVALIFOLIA, Wt. Ic. t. 1383; F. B. I. iv. 143.

   W. Ghâts, E. side, from Coimbatore southwards, at low levels.

   A small branching tree with pale brown branches, white flowers and red drupes.

6. EHRETIA WIGHTIANA, Wall.; F. B. I. iv. 143; Wt. Ic. t. 1384.

   W. Ghâts, hills of Tinnevelly about Courtallum.

   A shrub with slender pale brown branchlets and white flowers.

7. EHRETIA PUBESCENS, Benth. in Royle Ill. 306. *Ehretia laevis*, Roxb., var. *pubescens*, C. B. Clarke; F. B. I. iv. 142.

   Deccan, hills of Cuddapah and Nellore up to 3,000 ft., E. slopes of the Anamalais.

   Apparently a shrub with stout pale brown branchlets.

8. EHRETIA MICROPHYLLA, Lamk. *E. buxifolia*, Roxb. Cor. Pl. t. 57; F. B. I. iv. 144.

N. Circars, Deccan and Carnatic, eastwards to the slopes of the W. Ghâts, southwards to S. Travancore, common in dry scrub forests.

A small shrub reaching 3–4 ft. high, with fascicled very coriaceous small leaves and a scarlet globose drupe. Vern. *Tel.* Bupana buri.

3. Coldenia, Linn.

Prostrate scabrid herbs. *Leaves* alternate, small, crisped. *Flowers* white or yellow, axillary, sessile or nearly so, the upper sometimes in a one-sided leafy spike. *Calyx* 4–5-partite; lobes lanceolate or linear. *Corolla*-tube short; lobes 4–5, imbricate in bud. *Stamens* 4–5, on the corolla-tube, included; anthers ovate. *Ovary* 2-celled with 2 ovules in each cell, or imperfectly 4-celled; styles 2, distinct from the base or slightly cohering upwards; stigmas capitate. *Fruit* a nearly dry drupe of 4 subconnate 1-seeded pyrenes. *Seeds* with thin testa; albumen scanty or 0; cotyledons flat.

Coldenia procumbens, Linn.; F. B I. iv. 144.

All plains Districts, on moist ground on the margins of tanks, etc., and in rice-fields, but in the dry season chiefly if not solely.

A procumbent herb with trailing stems lying flat on the ground, the young parts very white-silky, the leaves obovate-oblong, crenate, up to 1·5 in. long at the main nodes, much smaller on the branchlets and very shaggy, the nerves impressed deeply; the pyrenes rounded on the back, combined in a sharp-pointed pyramid.

4. Rotula, Lour.

A shrub with virgate branches. *Leaves* small, alternate or fascicled, entire or obscurely toothed. *Flowers* small, few, on short lateral branchlets, between the leaves, sometimes laxly racemose; bracts 2. *Calyx* 5-partite; lobes lanceolate, acuminate, imbricate. *Corolla*-tube short, campanulate; lobes 5, oblong, imbricate in bud. *Stamens* 5, on the corolla-tube; anthers oblong or ovate. *Ovary* ovoid, 2-celled with 2 ovules or 4-celled with 1 ovule in each cell; style filiform, simple; stigma capitate. *Fruit* a drupe with 4 crustaceous 1-seeded pyrenes.

Seeds oblong; testa membranous; albumen scanty; cotyledons ovate.

ROTULA AQUATICA, Lour.; Robins. in Philipp. J Sc. iv. 693. *Rhabdia lycioides*, Mart.; F. B. I. iv. 145. *Ehretia cuneata*, Wt. Ic. t. 1385.

Most Districts, on the banks and rocks on the margins of rivers and streams, often where occasionally submerged in floods.

A small branching shrub, often villous, the branches rooting, the leaves small and narrow, spathulate, up to 1 in. long, often tomentose beneath, the flowers purple, the fruit red or orange.

5. Tournefortia, Linn.

Trees or shrubs, often climbing more or less. *Leaves* alternate, entire. *Flowers* numerous, in terminal, rarely lateral or extra-axillary, dichotomous scorpioid cymes, white or greenish-yellow. *Calyx* of 5 ovate or lanceolate sepals. *Corolla*-tube usually cylindric; lobes 4 or 5, short, spreading. *Stamens* 4 or 5, included in the corolla-tube; filaments short; anthers oblong. *Ovary* 4-celled, ovule 1 in each cell, pendulous; style terminal, short and ending in a shortly 2-lobed stigma. *Fruit* a small ovoid scarcely fleshy drupe, separating into 2 or 4 pyrenes. *Seed* straight or curved, albuminous; testa thin; cotyledons oblong.

Leaves oblong-lanceolate, long-acuminate, the nerves oblique:—

Leaves cuneate or unequal at base, under surface green, dark brown when dry, up to about 6 in. long, 1·5 in. broad, main nerves about 7 pairs ..... 1. *Heyneana.*

Leaves usually rounded at base, under surface pale, with brownish-purple reticulation, up to 6 in. long, 2 in. broad, main nerves about 8 pairs ..... 2. *reticosa.*

Leaves ovate or ovate-oblong, shortly acuminate, subcordate at base, the under-surface dark brown, up to about 6 in. long, 2·5 in. broad ..... 3. *Wightii.*

1. TOURNEFORTIA HEYNEANA, Wall.; F. B. I. iv. 145.

W. Ghâts, Nilgiri and Anamalai Hills, about 3,000 ft.

A subscandent shrub with the flowers uniserial on the cyme-branches, the corolla-tube ·3 in. long.

2. TOURNEFORTIA RETICOSA, Wt. Ic. t. 1386; F. B. I. iv. 146.

W. Ghâts, Coorg, Wynaad and hills of Travancore at 3,000–4,500 ft

A subscandent shrub similar to the last but the leaves more prominently reticulately nerved beneath, the drupes ovoid with 2 pyrenes, each with 2 seeds.

3. TOURNEFORTIA WIGHTII, C. B Clarke; F. B. I. iv. 146.

W. Ghâts, Anamalai Hills at 4,500 ft.

A subscandent shrub similar to the others but more pubescent and with broader leaves having less oblique nerves.

6. Heliotropium, Linn.

Annual or perennial herbs or undershrubs, usually villous or scabrous. *Leaves* alternate. *Flowers* small, white or pale purple, in usually terminal dichotomous cymes, the branches often in long spikes or racemes and scorpioid; bracts small or 0, sometimes leafy with the cymes axillary. *Calyx* 5-lobed; lobes lanceolate or linear. *Corolla*-tube cylindric; lobes 5, imbricate or conduplicate, usually spreading in flower. *Stamens* 5, on the corolla-tube, included; filaments short; anthers ovate or lanceolate, sometimes connected by the tips of the apiculate connectives. *Ovary* completely or imperfectly 4-celled; ovules solitary in each cell: style terminal, short or rather long, ending in a flat or conical disk surmounted by the entire or rarely bifid short stigma. *Fruit* dry, indehiscent, 2- or 4-lobed, at length splitting into 4 usually distinct nutlets. *Seeds* straight or curved; albumen usually scanty; cotyledons plano-convex, radicle short.

Lobes of the corolla cordate-acuminate, anthers with the produced connective bifid or trifid at apex; stigma elongate, white-penicillate at apex; leaves lanceolate, 1–2 in. long, ½–¾ in. broad, with stiff hairs from bulbous bases; nutlets margined, rounded and tuberculate on the back ..... 1. *subulatum.*

Lobes of the corolla broad, very shortly pointed, plicate in bud and usually incurved:—

Calyx in fruit closely enveloping the nutlets, very woolly; anthers lanceolate, near the top of the tube; stigma conical or cylindric with penicillate apex; leaves elliptic or ovate, obtuse, softly white-woolly, up to 1 in. long, the nerves impressed; nutlets usually margined, rounded and tuberculate on the back ..... 2. *supinum.*

Calyx in fruit not closely enveloping the nutlets, usually with rare or lobes :—

Stamens separate, usually [illegible]

Nutlets all separating; stigma sessile or nearly so :—

Leaves obovate-spathulate, obtuse, densely softly white-silky, 0·5–1·5 in. long, ·3–·5 in. broad, petioled; stigma elongate conical, minutely pubescent; nutlets densely pubescent, acute at apex ..... 3. *sessiliflorum*.

Leaves linear or linear-spathulate or lanceolate, glaucous, fleshy, up to 1·5 in. long; stigma conical, apex bifid; nutlets glabrous, smooth on the back, the margins corky ..... 4. *curassavicum*.

Nutlets combined in pairs, separating later, beaked angled and with an empty cavity; stigma obtuse, above the lobed ring; leaves ovate, obtuse, narrowed or cordate at base, often crisped undulate, usually decurrent on the long petiole, up to 4 in. long, 3–4 in. broad, hispid-pubescent ..... 5. *indicum*.

Stamens joined together by their tips, afterwards separating and apiculate; stigma conical above the umbrella-shaped ring, stalked by the style :—

Flowers in elongate racemes; erect herbs :—

Bracts small, linear; leaves linear or narrowly oblong, up to 1 in. long, ·1 in. broad; stems nearly glabrous; nutlets globose, sparingly hirsute ..... 6. *zeylanicum*.

Bracts rather large, lanceolate, veined; leaves linear-lanceolate, up to 1·5 in. long, ·25 in. broad, softly strigose-hirsute; stems also softly hirsute; nutlets globose, glabrous except near the apex ..... 7. *bracteatum*.

Flowers in spikes or racemes, bracteate; much-branched, low, sometimes procumbent undershrubs :—

Bracts inconspicuous; branches and leaves very white-strigose hispid; flower-spikes up to 3 in. long; leaves narrowly oblong-lanceolate, up to ·6 in. long, the margins reflexed; nutlets ovoid, with minute grey hairs ..... 8. *brevifolium*.

Bracts conspicuous :—

Branches stout, divaricating, covered with white appressed strigose hairs; leaves linear-oblong, also white-strigose, the margins reflexed, up to ·6 in. long, ·15 in. broad; flower-spikes 1–2 in. long, the bracts ovate; nutlets depressed, densely white strigose-hirsute ..... 9. *Kotschyi*.

Branches twiggy, radiating from the rootstock, procumbent or slightly ascending, appressed hirsute; leaves ovate lan-

ceolate or linear-lanceolate, strigosely hirsute, the margins flat, ·25–·75 in. long; flower-spikes very short but sometimes up to 1 in. long; nutlets subglobose, bristly, usually depressed 10. *scabrum*.

1. HELIOTROPIUM SUBULATUM, Hochst.; Duthie Fl. Gang. Pl. ii. 91. *H. zeylanicum*, C. B. Clarke; F. B. I. iv. 148, *not of* Lamk.; Wt. Ic. t. 892. *Tournefortia zeylanica*, Wt. Ill. t. 170.

   Deccan and Carnatic, often on black cotton soil.

   An erect scabrous hispid annual with flowers in long usually unilateral spikes.

2. HELIOTROPIUM SUPINUM, Linn.; F. B. I. iv. 149; Wt. Ic. t. 1387.

   Deccan and Carnatic, often on black cotton soil, also on dry rice-fields and other cultivated lands.

   A prostrate softly white villous annual herb, the very small flowers in short one-sided simple or branched woolly spikes. The branches are sometimes ascending (var. *malabaricum*, C. B. Clarke).

3. HELIOTROPIUM OVALIFOLIUM, Forsk.; F. B. I. iv. 150. *H. coromandelianum*, Retz; Wt. Ic. t. 1388.

   All plains Districts, on waste lands, fallow fields and roadsides, common.

   A large erect or decumbent softly white villous herb, often with long branches from a thick root-stock. Flowers white, in long slender ebracteate pairs of spikes, the calyx persistent after the nutlets fall.

4. HELIOTROPIUM CURASSAVICUM, Linn.

   Coromandel Coast, on salt backwaters as at Madras, Vizagapatam and Tuticorin, common, introduced probably from the W. Indies.

   A glaucous fleshy herb with small white flowers, yellow in the centre, in rather short pairs of unilateral spikes.

5. HELIOTROPIUM INDICUM, Linn.; F. B. I. iv. 152. *Tiaridium indicum*, Wt. Ill. t. 171.

   All plains Districts, on roadsides and in waste places, common.

   A coarse annual herb reaching 2 ft. in height, with pale violet small flowers in long spikes, the leaves large.

6. HELIOTROPIUM ZEYLANICUM, Lamk., Duthie Fl. Gang. Pl.

ii. 93, *not of* F. B. I. *H. paniculatum*, R. Br.; F. B. I. iv. 151. *H. linifolium*, Lehm.; Wt. Ic. t. 1391.

N. Circars, Deccan and Carnatic.

An erect herb with stout rootstock and long twiggy branches bearing conspicuously long slender racemes of distant flowers, especially in fruit, the flowers rather large, the limb white, the tube yellow, the leaves very narrow.

7. HELIOTROPIUM BRACTEATUM, R. Br.; F. B. I. iv. 151. *H. laxiflorum*, Roth.

N. Circars, Deccan and Carnatic, on dry rocky hills, in Cuddapah at Guramkonda up to 3,000 ft.; Kambakam Drúg in Chingleput.

A slender erect herb reaching 2 ft. in height, softly strigosely hirsute, the racemes with rathe large bracts.

8. HELIOTROPIUM BREVIFOLIUM, Wall. *H. strigosum* var. *brevifolia*, C. B. Clarke; F. B. I. iv. 151.

Deccan and Carnatic, up to 5,000 ft. in hilly country

A much-branched undershrub with narrow very white strigose leaves.

9. HELIOTROPIUM ROTTLERI, Lehm.; F. B. I. iv 151; Wt. Ic. t. 1392.

Deccan, about Coimbatore, usually on black cotton soil.

A stiff undershrub, much spreading and covering many feet of surface (Wight), all parts, including the flowers, very white.

10. HELIOTROPIUM SCABRUM, Retz.; F. B. I. iv. 152; Wt. Ic. t. 1389. *H. marifolium*, Retz.; F. B. I. iv. 152 *in part.*

All plains Districts, on sandy lands, waste places, roadsides, etc., common.

A much branched woody herb growing in tufts, the branches often procumbent, rarely ascending, flowers white, crowded among the upper leaves.

Var. *Wallichii*. *H. marifolium* var. *Wallichii*, C. B. Clarke, F. B. I. iv. 152; Wt. Ic. t. 1390.

Branches more ascending and with longer spikes of flowe leaves narrower, elliptic-oblong. All plains Districts, with the type

Heliotropium peruvianum, Linn., the Cherry Pie of English gardens, is commonly found in gardens in S. India, especially in the hills, where it grows into a shrub and has fragrant lilac-blue flowers.

7. Trichodesma, R. Br.

Coarse erect usually hispid herbs. *Leaves* **opposite or alternate, entire, the upper face often covered with prominent white tubercles each with a hair.** *Flowers* **solitary on axillary pedicels, but passing into terminal racemes by the gradual reduction of the floral leaves.** *Calyx* **deeply 5-lobed, enlarged in fruit; lobes triangular-lanceolate.** *Corolla*-**tube cylindric or campanulate; throat naked but sometimes with glandular spots; lobes 5, twisted to the left, often mucronate or apiculate.** *Stamens* **5, on the corolla-tube; filaments short; anthers elongate-lanceolate, connivent in a cone, the connective produced and its tips sometimes twisted.** *Ovary* **4-celled; ovules solitary in the cells; style slender; stigma small.** *Fruit* **pyramidal, with a central quadrangular carpophore with 4 bays each with an ovoid oblong nutlet adnate to the torus, the nutlets smooth or tuberculate, often margined and sometimes glochidiate.** *Seeds* **suborbicular or obovoid, exalbuminous; cotyledons plano-convex, fleshy; radicle short.**

Calyx-lobes hastate at base; corolla-tube as long as the lobes, which are [illegible] slenderly abruptly apiculate and recurved in flower; glandular spots [illegible] the throat 2 to each lobe; stamens closely connivent, densely short [illegible]ate, the tips with spirally twisted hair-like points; nutlets smooth on the outer, rugosely regularly pitted on the inner face; leaves variable, lanceolate or ovate or oblong, cordate or hastate, villous and hispid, up to about 2 in. long, ·5 in. broad ....1. *indicum*.

Calyx-lobes cordate or slightly hastate at base; corolla-tube much longer than the short cordate obtuse or apiculate lobes, not recurved in flower; glandular spots to 2 lobes only; stamens separating, the tips pointed, not twisted, shorter than the long tufted hairs of the connective; nutlets smooth on the outer face, the inner ridged in the middle and with a few pits on the margin; leaves oblong, cordate, up to 4 in. long, 2 in. broad, prominently hispid but not villous ..2. *amplexicaule*.

Calyx-lobes rounded at base, softly villous; corolla-tube rather longer than the lobes, which are broadly obovate with an abrupt slender twisted apiculus, and recurved in flower, no glandular spots; stamens connivent but easily separating, densely villous on the back, the tips with spirally twisted ribbon-like points; nutlets smooth on the outer face, the inner spotted or slightly rugose; leaves oblong-lanceolate, up to 8 in. long, 3 in. broad, prominently hispid

3. *zeylanicum*.

1. **Trichodesma indicum**, R. Br.; F. B. I. iv. 153; Wt. Ill. t. 172.

   All plains Districts by roadsides and on stony dry waste land, often on black cotton soil, common; ascending low elevations in the Hills.

   An erect annual grey-villous hispid herb reaching 18 in. in height, with pale blue flowers, sometimes pink or white.

2. Trichodesma amplexicaule, DC.; Sedgw. in Rec. Bot. Surv. Ind. vi. 347, *not of* Roth; F. B. I. iv. 153.

   Deccan, in Hyderabad, Bellary and Mysore.

   An erect hispid herb with broader leaves than No. 1 and not villous. Sometimes the calyx approaches that of *T. indicum*, but the corolla and stamens are those of *T. amplexicaule*.

3. Trichodesma zeylanicum, R. Br.; F. B. I. iv. 154.

   All dry Districts, up to 4,000 ft. in the Hills, common.

   A large annual herb with light blue flowers in terminal paniculate cymes with long drooping pedicels, and many reduced leaves.

8. Cynoglossum, Linn.

Erect biennial or perennial herbs. *Leaves* alternate, the radical petioled, the cauline sessile. *Flowers* in elongated sparingly branched or loosely paniculate racemes, purple or blue, ultimately distant; bracts 0. *Calyx* 5-lobed, spreading in fruit, sometimes enlarged. *Corolla*-tube short with 5 obtuse or emarginate scales in the throat; lobes 5 spreading, obtuse, imbricate in bud. *Stamens* 5, inserted on the corolla-tube, included; filaments short; anthers ovate. *Ovary* 4-lobed from a nearly flat receptacle; ovules horizontal, attached to the inner angle of the cell; style gynobasic from between the bases of the lobes, short or long, persistent; stigma small. *Fruit* a depressed pyramid of 4 nutlets adnate to a conic-based carpophore, their bases produced downwards, the outer faces convex or flattened, margined or not, glochidiate. *Seeds* straight or little curved; cotyledons flattened; radicle short.

Stems and branches of inflorescence softly appressed grey-pubescent, the young racemes tawny-villous; leaves thick, oblong-lanceolate, prominently nerved, the nerves joining in arches; flowers pink in bud, then blue, rather large, nearly ·25 in. long; nutlets margined with a row of prickles, others on the faces.....1. *furcatum*.

Stems and branches of inflorescence with strigose villous hairs usually with bulbous bases; leaves thin, elliptic-lanceolate, the nerves distant and not prominent; flowers pale lilac or light blue, small, scarcely ·15 in. long; nutlets not prominently margined, covered with glochidiate prickles ..... 2. *denticulatum* var. *zeylanicum*.

1. CYNOGLOSSUM FURCATUM, Wall.; F. B. I. iv. 155; Wt. Ic. t. 1395.

W. Ghâts, from S. Canara and Mysore southwards, above 4,000 ft.; Shevaroy, Kollimalai and other hills of the Carnatic.

An erect annual reaching 3 ft. in height, with the inflorescence branching sparingly and prominently furcately in long racemes.

2. CYNOGLOSSUM DENTICULATUM, A. DC.; F. B. I. iv. 157.

Var. *zeylanicum*, C. B. Clarke.

N. Circars, Deccan and Carnatic, in hilly country, 1,000–6,000 ft.; W. Ghâts, on the E. side and towards the south.

An erect annual reaching about 2 ft. in height, the inflorescence with many branches in long slender racemes, the basal leaves often very long-petioled.

9. Paracaryum, Boiss.

Erect or decumbent biennial or perennial herbs. *Leaves* alternate. *Flowers* in elongate, sparingly branched, usually ebracteate often paniculate racemes, violet or blue. *Calyx* 5-lobed, spreading in fruit, not much enlarged. *Corolla*-tube short with 5 rather large obtuse or emarginate scales in the throat; lobes 5, spreading, obtuse, imbricate in bud. *Stamens* 5, inserted on the corolla-tube; filaments slender; anthers oblong, included or slightly exserted. *Ovary* 4-lobed from a flat receptacle; ovules attached to the inner angle; style short or long; stigma small. *Fruit* a pyramid of 4 nutlets attached to a conical or columnar carpophore, their apices not or slightly produced, their bases rounded, glochidiate; margins membranous and inflexed glochidiate, enclosing the flattened slightly hispid surface. *Seeds* straight, margined; cotyledons flattened; radicle small.

Flowers pale blue with a darker centre, corolla ·25 in. long, anthers included in the tube; inflorescence branches slender; nutlets rather sparingly glochidiate, the ring formed by the racemed margins triangular

in shape; radical leaves very long petioled, blade up to 6 in. long, cordate, cauline ovate, membranous, the nerves obscure ..1. *coelestinum.*
Flowers dark blue, uniform, corolla ·5 in. long, anthers slightly exsert from the tube; inflorescence branches thick and rather short; nutlets much glochidiate, the ring circular; radical leaves long-petioled, blade up to 8 in. long, deeply cordate, cauline ovate, cordate, thick, the nerves conspicuous .....2. *malabaricum.*

1. PARACARYUM COELESTINUM, Benth.; F. B. I. iv. 160. *Echinospermum coelestinum*, Wt. Ic. t. 1394.
   Bababudan Hills of Mysore (Law).
   An erect branching nearly glabrous herb reaching 5 ft. in height, the stems red (Cooke).
2. PARACARYUM MALABARICUM, C. B. Clarke; F. B. I. iv. 160.
   Canara and Mysore (Law).
   An erect stout branching tomentose herb reaching 3 ft. in height, the stems green (Cooke).

Family CV. CONVOLVULACEAE.

Herbs or shrubs, usually twining, rarely trees. *Leaves* alternate or in parasitic species 0; stipules 0. *Flowers* regular, hermaphrodite, in pedunculate axillary bracteate cymes, rarely solitary. *Calyx* free, often persistent, of 5 sepals which are often unequal and sometimes accrescent. *Corolla* campanulate or funnel-shaped or subrotate; limb entire, shortly lobed, often plicate in bud. *Stamens* 5, on the corolla-tube; filaments usually slender, sometimes enlarged at base; anthers linear or oblong, dorsifixed, dehiscing longitudinally. *Disk* usually annular. *Ovary* superior, 1–4-celled; ovules 2, less commonly 1 or 4, in each cell; style filiform, simple or forked; stigma capitate or 2-lobed or stigmas 2. *Fruit* a berry or capsule dehiscing by 2 valves or circumsciss or irregularly. *Seeds* 4–2, rarely 1, erect; albumen scanty or 0; cotyledons generally plaited, often 2-lobed, rarely flat, not apparent in *Cuscuta*; radicle next the hilum.

Erect or climbing plants with leaves, not parasitic :—
  Pollen grains spinulose :—
    Fruit indehiscent, woody mealy or fleshy :—
      Corolla salver-shaped; stigmas 2, their lobes linear-oblong
      1. Rivea.

Corolla funnel-shaped; stigma biglobose:—

Sepals large, accrescent and completely enclosing the fruit **2. Stictocardia.**

Sepals small, ovate or oblong, not enlarging to enclose the fruit:—

Ovary 4-celled ..... **3. Argyreia.**

Ovary 2-celled ..... **4. Lettsomia.**

Fruit dehiscent or if indehiscent thin and fragile-walled:—

Stamens arising directly from the corolla-tube:—

Corolla usually campanulate; sepals not aristate; stamens not exserted ..... **5. Ipomaea.**

Corolla usually salver-shaped; sepals aristate:—

Flowers small, red, rather irregular ..... **6. Quamoclit.**

Flowers large, white or purple, regular ..... **7. Calonyction.**

Stamens arising from the backs of 5 scales at the base of the corolla-tube; corolla small, urceolate; fruit 4-valved **8. Lepistemon.**

Pollen grains not spinulose:—

Fruit dehiscent, or, if not, small, with thin fragile walls; style or **styles present**; leaves usually thin:—

Sepals much enlarged in fruit; flowers in racemes or panicles; **capsule 1-seeded**, indehiscent, rarely 2-valved; style entire or 2-lobed ..... **9. Porana.**

Sepals not or slightly enlarged in fruit; capsule dehiscing valvately or circumsciss or irregularly:—

Styles 2, free or partly united below:—

Capsule sessile in the middle of a large flat bract **10. Neuropeltis.**

Capsule not sessile on a bract:—

Corolla-lobes imbricate; flowers usually solitary, axillary; styles 2, quite free; stamens exserted ..... **11. Cressa.**

Corolla-lobes induplicate-contorted; flowers cymose; **stamens not exserted:—**

Capsule 4-valved; styles free, each 2-branched; stigmas on the inner face of the style arms .... **12. Evolvulus.**

Capsule irregularly dehiscent; styles usually partly united below, not branched above; stigmas 2, capitate **13. Breweria.**

Styles entire; stigmas usually 2-lobed:—

Ovary 1-celled; capsule 4-valved, 3-seeded; stigma-lobes short, oblong ..... **14. Hewittia.**

Ovary 2-, sometimes 4-celled:—

Outer sepals larger than inner and decurrent on the peduncle; stigma-lobes globose ..... **15. Aniseia.**

Outer sepals not larger than the inner and not decurrent :—

Stigma lobes elongate :—

Stems erect or prostrate, rarely twining : stigma-lobes oblong or linear ; capsule 4-valved 16. **Convolvulus.**

Stems twining, rarely prostrate ; stigma lobes elliptic ; capsule usually 8-valved ..... 17. **Jacquemontia.**

Stigma biglobose :—

Capsule 4-valved ; stems not usually winged 18. **Merremia.**

Capsule dehiscing circumscissile or irregularly ; stems winged ..... 19. **Operculina.**

Fruit indehiscent, woody or fleshy, rather large ; style short or 0 ; stigma 5–10-rayed ; corolla-lobes obcordate ; leaves coriaceous 20. **Erycibe.**

Parasitic leafless twining herbs ; corolla-lobes imbricate ; embryo spiral 21. **Cuscuta.**

1. Rivea, Chois.

Erect and straggling or climbing shrubs. *Leaves* cordate, **apiculate, more or less silky-pubescent** beneath ; petiole long. ***Flowers* axillary, on 1–3- or sometimes more-flowered peduncles ; bracts 2–3, narrow.** *Calyx* of 5 ovate or oblong subequal sepals. ***Corolla* large, white, salver-shaped ; tube narrow, cylindric ; lobes of the limb rounded, plicate.** ***Disk* annular.** *Stamens* included, **near the middle of the tube ; filaments** slender, villous at the base ; **anthers narrow oblong ; pollen** grains spinulose. *Ovary* **4-celled with 4 ovules ; style filiform** : stigmas 2, linear-oblong, rugose. ***Fruit* subglobose, dry, indehiscent** or breaking up **irregularly, often 1-celled by the absorption of the septa.** *Seeds* **4 or fewer, glabrous, surrounded by mealy pulp ; cotyledons much folded ; radicle thick.**

Peduncles usually 1-flowered ; corolla usually glabrous without ; sepals ovate obtuse ; leaves usually about 2 in. long, 3 in. broad, sparsely grey-silky beneath, the basal sinus shallow ..... 1. *hypocrateriformis.*

Peduncles usually 3- or more-flowered ; corolla white-silky without ; sepals oblong or lanceolate, acute ; leaves about 3 in. long, 4 in. broad, densely white silky-tomentose beneath when young, the basal sinus deep ..... 2. *ornata.*

1. **Rivea hypocrateriformis, Choisy ; F. B. I. iv. 184.**

N. Circars, Deccan and Carnatic, especially near the sea,

in hedges and dry open forests. Clove-scented creeper or Midnapore creeper.

A climbing shrub with large white flowers which open at sunset and close at sunrise and are very fragrant. Bark thin, grey; wood soft, in concentric rings.

2. RIVEA ORNATA, Choisy; F. B. I. iv. 183; Wt. Ic, t. 1356.

Deccan and Carnatic, in dry forests, scarce.

A climbing or straggling shrub with large white flowers, night-opening and fragrant, the fruit yellowish brown, dry, the leaves with pits on the back above the petiole.

2. Stictocardia, Hallier f.

Climbing shrubs. *Leaves* cordate, long-petioled. *Flowers* axillary on 1–3-flowered peduncles; bracts small, caducous. *Calyx* of 5 orbicular herbaceous subequal sepals, in fruit much enlarged, imbricate, mucilaginous, enclosing the fruit in an apple-like case. *Corolla* widely funnel-shaped, 5-lobed, the limbs plicate, nearly glabrous without. *Stamens* 5, included, filaments villous at base; anthers oblong, straight; pollen-grains spinulose. *Ovary* 4-celled, 4-ovuled; style filiform; stigma 2-globose. *Fruit* thin-walled, dry, indehiscent, closely enveloped in the accrescent calyx. *Seeds* 4, minutely villous.

STICTOCARDIA TILIAEFOLIA, Hallier f. in Engl. Jahrb. xviii. 159. *Argyreia tiliaefolia*, Wt. Ic. t. 1358; F. B. I. iv. 184.

W. Coast, S. Canara to Cochin; Carnatic, near Coimbatore about 1,300 ft. (Wight, Fischer), Cumbum Hills of Madura (Beddome).

A diffuse climber with large handsome rose-purple flowers, the leaves up to 5 in. in diam., apiculate, obtuse or sometimes emarginate.

3. Argyreia, Lour.

Climbing, sometimes erect shrubs. *Leaves* ovate-cordate to lanceolate, usually pubescent tomentose strigose or silky beneath. *Flowers* axillary, in cymes often many-flowered, often capitate; bracts usually conspicuous. *Calyx* of 5 herbaceous sepals, leathery and little enlarged in fruit, often red within. *Corolla* tubular, funnel-shaped, large and showy, red or purple; limb plicate, the parts exposed in bud more or less hirsute, lobes short. *Stamens* 5, included; filaments often enlarged and villous at base; anthers

oblong, straight; pollen-grains spinulose. *Disk* annular. *Ovary* 4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a dry or fleshy berry. *Seeds* 4 or fewer, embedded in mealy pulp.

Climbing shrubs:—

Leaves glabrous on the upper surface:—

Leaves ovate-oblong to oblong, acute at apex, rounded or cuneate at base, appressed strigose beneath, up to 8·5 in. long, 4 in. broad, the main nerves oblique; cymes few-flowered on stout peduncles; bracts narrowly oblong, ·5–·75 in. long; outer sepals ovate-oblong, inner smaller lanceolate, all strigosely hirsute; berry ·5 in. in diam. 1. *Daltoni.*

Leaves broadly ovate, rounded or cordate at base:—

Sepals ovate or orbicular, obtuse:—

Sepals thick, ·5–·7 in. long, densely white-tomentose without; bracts ovate-lanceolate, caudate acuminate, up to 1·5 in. long, thin; leaves broadly ovate-cordate, acute at apex, densely silky-white-tomentose beneath, up to 10 in. or more in diam. 2. *speciosa.*

Sepals rather thin, subequal, ·2–·3 in. long, with sparse strigose hairs without; bracts linear- or oblong-lanceolate, ·5–1 in. long, sparsely hairy; leaves broadly ovate, cordate or nearly rounded at base, acuminate at apex, up to 6 in. in diam., sparingly strigose beneath .....3. *populifolia.*

Sepals lanceolate, acute or acuminate:—

Sepals unequal, the 2 outer longer and often caudate, about ·75 in. long, the 3 inner acuminate, shorter, all sparsely stiff strigose on the back and tips; bracts linear-oblong, about 1 in. long, villous; leaves ovate or deltoid, acute or acuminate at apex, rounded truncate or cordate at base, up to 7 in. long, 4 in. broad, sparsely strigose beneath .....4. *involucrata.*

Sepals subequal, with scarious margins, acuminate, ·4 in. long, strigose on the back; bracts oblong-lanceolate or oblanceolate, ·75–1·25 in. long, tawny-villous; leaves broadly ovate, usually obtuse or sometimes emarginate at apex, truncate or slightly cordate at base, densely tawny tomentose beneath, up to 6 in. in diam.....5. *bracteata.*

Leaves hairy on the upper surface:—

Bracts orbicular, persistent, softly pubescent, ·5 in. in diam.; sepals also orbicular or broadly obovate, pubescent, the 2 inner narrower than the others; leaves broadly ovate, shortly acuminate, cordate at base with rounded lobes, pubescent on both sides, up to 4 in. in diam. .....6. *cymosa.*

Bracts linear or oblong :—

Sepals unequal, narrow, linear-oblong or lanceolate :—

Two outer sepals linear-oblong, ·6 in. long, inner 3 lanceolate-acuminate, ·4 in. long; bracts large, tawny-silky, 1–1·5 in. long, nerved; leaves ovate, shortly acute, rounded or slightly cordate at base, sparsely hispid above, densely silky beneath, up to 4 in. long, 2·5 in. broad .... 7. *sericea*.

Sepals lanceolate acuminate, outer ones ·6 in. long, inner less; bracts narrowly oblong, very white-silky, ·5–1 in. long, not nerved; leaves ovate, acute, slightly cordate at base, sparsely hispid above, silky beneath, up to 3·5 in. long, 1·5 in. broad 8. *Thwaitesii*.

Sepals nearly equal, usually ovate :—(Cuttack hairs)

Sepals acuminate or acute, exposed parts strigose :—

Sepals ovate lanceolate, acuminate, ·3–·4 in. long, inner narrowly linear-oblong, sometimes subspathulate, ·3–·4 in. long, strigose-hirsute; leaves broadly ovate, acute, rounded or slightly cordate at base, both sides roughly but sparsely fulvous-strigose, the hairs bulbous-basal, up to ·7 in. long, 6 in. broad .... 9. *pilosa*.

Sepals ovate, the outer acute, the inner obtuse, ·2 in. long; bracts linear-oblong, ·7 in. long; leaves elliptic-ovate, acute, rounded or rhomboid at base, upper side sparsely strigose, lower more densely silvery hairy, up to 5 in. long, 2·5 in. broad .... 10. *Lawii*.

Sepals ovate, obtuse :—

Sepals, especially exposed parts, strigosely hirsute :—

Branchlets and leaves beneath very softly white-tomentose, upper surface more sparsely so, leaves elliptic-ovate, obtusely acute or sometimes emarginate, up to 3 in. long, 2 in. broad; bracts oblong, silky, caducous, ·5–·75 in. long .... 11. *pomacea*.

Branchlets and leaves densely covered with golden brown strigose hairs; leaves broadly ovate, abruptly acute, cordate, but not deeply, at base, up to 6 in. in diam.; bracts oblong, persistent, up to 1 in. long or more 12. *nellygherrya*.

Branchlets sparsely, leaves more densely, covered with grey or slightly golden hairs, strigose above, tomentose beneath; leaves broadly ovate, abruptly acuminate, cordate at base, up to 5 in. or more in diam. and usually broader than long; sepals often subglabrous; bracts

linear or linear-oblong, persistent, prominent and often petioled, 1–2 in. long ..... 13. *hirsuta*.

Sepals ± villous except for a very few strigose bulbous-based hairs; branchlets pilose; leaves broadly ovate, acute or acuminate, rounded or very slightly cordate at base, sparsely pilose above, fulvous strigose beneath, up to 8 in. long, 5 in. broad; bracts linear, strigose, up to ·75 in. long

14. *cognorensis*.

Erect shrubs, sometimes slightly climbing:—

Sepals ·15 ·2 in. long, usually obtuse; leaves obovate or elliptic, obtuse or emarginate at apex, and apiculate, cuneate at base, nearly glabrous above, grey silky-villous beneath, up to 4 in. long, 2 in. broad, nerves rather distant ..... 15. *cuneata*

Sepals ·2 ·25 in. long, acute; leaves elliptic, acuminate, attenuate at base, glabrous above, densely white-silky beneath and shining, up to 4 in. long, nearly 2 in. broad, nerves close and parallel

16. *fulgens*.

1. ARGYREIA DALTONI, C. B. Clarke; F. B. I. iv. 190.
N. Circars, Ganjam to Godavari, in open forests.
A large climber with red-purple corollas up to 2 in. long.
2. ARGYREIA SPECIOSA, Sweet; F. B. I. iv. 185; Wt. Ic. t. 851.
Circars, Deccan and Carnatic to the E. slopes of the W. Ghâts and up to 3,000 ft.; often cultivated and found run wild near villages. The Elephant Creeper.
A very large climbing shrub with stout white-tomentose stems, long-peduncled cymes, large purple corollas silky-pubescent without and a nearly dry fruit. Vern. *Hind.* Samundar-sok.
3. ARGYREIA POPULIFOLIA, Choisy; F. B. I. iv. 187.
W. Coast, S. Canara to Travancore.
A rather slender climber with rose-purple corollas, slightly villous without.
4. ARGYREIA INVOLUCRATA, C. B. Clarke; F. B. I. iv. 187.
N. Circars, Rampa Hills at 2,500 ft. (V. Narainswami); Bababudan Hills of Mysore (Law); Shevaroy Hills (Bourne).
A large twining shrub, the corollas pinkish-grey (Narainswami), the bracts conspicuously persistent.
5. ARGYREIA BRACTEATA, Choisy; F. B. I. iv. 188.
Deccan, common in the Ceded Districts, up to 4,500 ft. on

Horsleykonda (Gamble), hills of Salem and Coimbatore; Carnatic, outer hills of Tinnevelly.

A climbing shrub with red-purple corollas, the large bracts conspicuous and persistent.

6. ARGYREIA CYMOSA, Sweet; F. B. I. iv. 190; Wt. Ic. t. 839.

N. Circars and Carnatic, in coast Districts, in hedges and low scrub.

A climbing not very shrubby plant with pale pink corollas and rather large soft fruit.

7. ARGYREIA SERICEA, Dalz.; F. B. I. iv. 188.

W. Ghâts, Nilgiris to hills of Tinnevelly, scarce.

A large silky twiner, with pink corollas 2·5 in. long.

8. ARGYREIA CHOISYANA, Wt.; F. B. I. iv. 190. *Batatas Choisyana*, Wt. Ic. t. 491.

Deccan, hills of the Ceded Districts—Kondaparthi (Wight), Cuddapah (Beddome).

A slender procumbent or twining herb with purple corollas 2 in. long, the upper leaves often not broader than ·75 in. and oblong-lanceolate.

9. ARGYREIA PILOSA, Wt. & Arn.; F. B. I. iv. 189.

Bababudan Hills of Mysore (Law); Ramandrug Hills of Bellary at 3,500 ft. (Gamble).

A large hirsute twiner with dark red or purple corollas, 2 in. long, the cymes in prominently bracteate capitate heads.

10. ARGYREIA LAWII, C. B. Clarke; F. B. I. iv. 190.

Bababudan Hills of Mysore (Law).

A slender twiner with very white silky stems and long-peduncled few-flowered cymes, the corollas 2 in. long.

11. ARGYREIA POMACEA, Choisy; F. B. I iv. 188. *Rivea pomacea*, Wt. Ic. t. 888.

W. Deccan, in the Coimbatore and Salem Districts; W. Ghâts, Nilgiris, Anamalais and Pulneys on E. slopes.

A large climber with purple corollas 2 in. long in lax few-flowered corymbs, and yellowish-brown pulpy fruit, ·7 in. long.

12. ARGYREIA NELLYGHERRYA, Choisy, F. B. I. iv. 189. *A. Leschenaultii*, Choisy; F. B. I. iv. 188 (?)

W. Ghâts, Nilgiri Hills, above 5,000 ft.

A large climber with, apparently, rose purple corollas, the

flowers in long-peduncled corymbs, the fruit ·5 in. in diam., black when dry.

13. ARGYREIA HIRSUTA, Arn.; F. B. I. iv. 189. *Rivea hirsuta*, Wt. Ic. t. 891.

W. Ghâts, hills of Mysore, Nilgiris and Pulneys, at 3,000–6,000 ft., very common in Nilgiris.

A large shaggy climber with large flowers, the corollas 3 in. long, pale purple, darker in the centre, the fruit orange-coloured when ripe.

14. ARGYREIA COONOORENSIS, Smith & Ramas. in Rec. Bot. Surv. Ind. vi. 30.

W. Ghâts, Coonoor in Nilgiris, at 6,000 ft. (Meebold).

A large climber with a purple (?) corolla 2 in. long, the flowers in rather shortly and slenderly peduncled cymes.

15. ARGYREIA CUNEATA, Ker-Gawl.; F. B. I. iv. 191. *Rivea cuneata*, Wt. Ic. t. 890.

Deccan, in hilly country, usually at 3,000–4,500 ft.

A very pretty silky shrub with bright purple corollas, the cymes axillary, 3- or more-flowered, the fruit ellipsoid, pointed, yellowish-brown, dry.

16. ARGYREIA FULGENS, Choisy; F. B. I. iv. 191; Wt. Ic. t. 1357.

W. Ghâts, Anamalais and hills of Travancore and Tinnevelly, about 3,000 ft.

A silky silvery shrub with (apparently) dark purple corollas, the cymes in axillary dichasia of about 7 flowers, the bracts crustaceous, ·5 in. in diam.

4. Lettsomia, Roxb.

Climbing shrubs. *Leaves* alternate, rounded rhomboid or cordate at base. *Flowers* in axillary peduncled corymbose or capitate cymes; bracts conspicuous. *Calyx* of 5 orbicular elliptic or oblong sepals, in fruit often thickened and enlarged. *Corolla* tubular funnel-shaped, usually pink, the limb plicate; lobes small. *Stamens* 5, included or exserted; filaments usually enlarged and villous at base; anthers oblong or linear; pollen-grains spinulose. *Disk* annular. *Ovary* 2-celled, 4-ovuled; style filiform; stigma 2-globose. *Fruit* a dry indehiscent berry. *Seeds* 4 or fewer, embedded in mealy pulp.

Corolla under 1 in. long; stamens exserted; leaves densely white-tomentose beneath; sepals in fruit red within; fruit red :—

Leaves ovate, cordate, obtuse or acute, sometimes emarginate, but apiculate, glabrous or strigose-villous on the upper surface, the tomentum of the lower very short; nerves impressed above, up to 4 in. in diam. .....1. *aggregata.*

Leaves broadly ovate, cordate, acute and apiculate, glabrous or slightly villous on the upper surface, white with spreading hairs beneath; nerves slightly raised above, up to 4 in. in diam., often broader than long .....2. *bella.*

Corolla more than 1 in. long; stamens included; bracts deciduous; sepals in fruit brown within :—

Corolla densely strigose without on parts exposed in bud; flowers in spreading corymbiform panicles densely strigose, the sepals ovate or orbicular, thick; leaves broadly ovate, cordate, acute or acuminate, sparsely hirsute, up to 5 in. in diam. sometimes small (var. *minor*) 3 *setosa.*

Corolla nearly or quite glabrous without; flowers in loose slender few-flowered corymbs, nearly glabrous, the sepals ovate or orbicular, usually glabrous; leaves elliptic or elliptic-lanceolate, subacute, rounded or rhomboid at base, glabrous or somewhat villous, the nerves often oblique, up to 4 in. long, 2·5 to 3 in. broad .....4. *elliptica.*

1. LETTSOMIA AGGREGATA. Roxb.; F. B. I. iv. 191; Wt. Ic. t. 1359. *L. mysorensis*, C. B. Clarke; F. B. I. iv. 192.

Deccan and Carnatic, in hilly country; W. Ghâts, on E. slopes and also in S. Travancore.

An extensively climbing shrub with pink flowers and red fruit, the bracts very white and orbicular, the 2 outer sepals larger than the inner.

Var. *osyrensis*, C. B. Clarke, *but not of* Roth *and* Choisy. Leaves above strigose villous. Hills of the Carnatic.

2. LETTSOMIA BELLA, C. B. Clarke; F. B. I. iv. 192.

N. Circars, in Gamjam (Gamble).

A climbing shrub like the former species but with more spreading tomentum, the bracts smaller and oblong, and, like the sepals, covered densely with strigose hairs.

3. LETTSOMIA SETOSA, Roxb.; F. B. I. iv. 194; Wt. Ic. t. 1360.

N. Circars, common, especially in Godavari, less so southwards except on the lower E. slopes of the Pulney Hills (Bourne, etc.).

A large climber with pink flowers and red berry, the inside of the tough fruiting calyx brown not red.

Var. *minor*, C. B. Clarke. Leaves small, scarcely 2 in. long, 1 in. broad, otherwise the same. Bababudan Hills of Mysore (Law).

4. LETTSOMIA ELLIPTICA, Wt.; F. B. I. iv. 192.

Deccan and Carnatic, in hilly country, up to 3,000 ft.; W. Ghâts, in all Districts at low levels and up to about 4,000 ft.

A rather bushy climber with pale purple flowers and orange fruit, very variable in the leaves and inflorescence especially as to hairiness and to the obliqueness of the nerves.

5. Ipomaea, Linn. (*in part*).

Twining or prostrate herbs, rarely shrubby or erect. *Leaves* alternate, entire or lobed or divided. *Flowers* axillary, solitary or in cymes; bracts various. *Calyx* of 5 equal or unequal, ovate or linear, sepals, often enlarged in fruit. *Corolla* campanulate or funnel-shaped, the limb plicate, very slightly lobed. *Stamens* 5, usually included; filaments filiform or dilated below, often unequal; anthers straight or contorted; pollen-grains spinulose. *Ovary* 2- (rarely 4-) celled; ovules 4, rarely 6; style filiform; stigma capitate, 2-globose. *Fruit* a 4–6-valved capsule, rarely indehiscent. *Seeds* usually 4 or 6, glabrous velvety or woolly; cotyledons crumpled, bilobed.

Leaves entire:—

Sepals, especially the outer, cordate at base, unequal, ciliate, ·5 in. long, lengthening in fruit; corolla tubular, ·6 in. long, the limb spreading; leaves ovate-cordate, acute or acuminate, the basal sinus deep, up to 3 in. in diam., nearly glabrous; seeds villous and with long silky hairs ..... 1. *calycina.*

Sepals not cordate at base:—

Sepals enlarged in fruit, outer lanceolate, inner linear, all acuminate and hirsute, ·75 in. long in flower; corolla funnel-shaped, the tube slender, glabrous or slightly pubescent, 2–3 in. long; bracts lanceolate, in pairs below the calyx; leaves ovate- or lanceolate-oblong, obtuse or acute, mucronate, subcordate at base, hispid, up to 2 in. long, ·5–1 in. broad; seeds puberulous, ciliate on the edges ..... 2. *barlerioides.*

Sepals not or only slightly enlarged in fruit :—

Flowers in sessile or nearly sessile heads, the corolla small, ·5 in. long, campanulate ; bracts linear ; leaves ovate-triangular, acute, apiculate, cordate at base, villous, up to 3 in. long, 1·5 in. broad ; seeds glabrous, minutely pitted .....3. *hispida.*

Flowers in pedunculate cymes or panicles :—

Sepals hispid :—

Flowers in short-peduncled few- (1–3-) flowered cymes with small linear bracts ; sepals ovate, with spreading hairs from bulbous bases ; corolla tubular, scarcely ·5 in. long ; leaves reniform or ovate-cordate, obtuse, sometimes sinuate or slightly dentate, 1–1·5 in. in diam. ; seeds white-velvety *4. rumicifolia.*

Flowers sessile, usually 3–6, enclosed in a perfoliate boat-shaped bract often 2·5 in. broad and ·75 in. deep, very long-hairy within ; sepals very unequal, the outer obovate or spathulate, the inner linear, densely long-hairy ; corolla-tube cylindric, slender, up to 1 in. long, the limb patent ; leaves broadly ovate-cordate, acute and apiculate, up to 3 in. in diam. ; seeds glabrous except for a few villous hairs on the margins .....5. *pileata.*

Sepals glabrous, sometimes slightly pubescent (Nos. 9 and 11) :—

Aquatic plants, more or less, prostrate and rooting in mud at the nodes or even floating on water :—

Sepals subequal, smooth, ovate, obtuse, ·2–·3 in. long ; corolla funnel-shaped, up to 2 in. long ; leaves variable, ovate or lanceolate or triangular, hastate or cordate at base, the basal lobes usually rounded, up to 5 in. long, 3 in. or less wide, long-petioled ; seeds minutely silky-puberulous .....6. *reptans.*

Outer sepals shorter, ·3 in. long, much wrinkled, inner longer, ·5 in. long, slightly wrinkled, all ovate obtuse ; corolla funnel-shaped, up to 2 in. long ; leaves ovate-cordate or reniform, subobtuse to even deeply emarginate, up to 4 in. in diam. ; seeds glabrous .....7. *repens.*

Land plants, climbing :—

Slender climbers :—

Sepals obtuse, shortly apiculate, the 2 outer slightly shorter, ·25 in. ; corolla funnel-shaped, 1·5 in. long, the mouth suddenly widened ; leaves variable, ovate-cordate with rounded basal lobes to hastate with acute lobes, acute at apex, up to 3 in. in diam. when hastate, indented

at the sides and only ·5–1 in. broad; seeds ·15 in., minutely tawny-velvety.....8. *sepiaria.*

Sepals acute, apiculate, the 2 outer shorter and slightly wrinkled, sometimes slightly pubescent, ·15 in.; corolla funnel-shaped, about 1 in. long, the mouth widened; leaves broadly ovate, acuminate, deeply cordate, up to 3 in. in diam.; seeds ·2 in., minutely dark brown-velvety .....9. *obscura.*

Stout straggling or climbing shrubs; seeds with long silky hairs:—

Sepals equal, orbicular, sometimes emarginate, ·2 in. long; flowers in lax panicles; corolla tubular campanulate, ·6 in. long or rather longer; leaves ovate or ovate-deltoid, obtusely acute and often slightly emarginate at apex, truncate or cordate at base, up to 5 in. long, 4 in. broad, prominently about 10-nerved; capsules ovoid, glabrous, ·35 in long; seeds black, the hairs white .....10. *staphylina.*

Sepals subequal, ovate-orbicular, sometimes emarginate, slightly puberulous, ·5 in. long, enlarged in fruit; flowers in corymbose cymes; corolla campanulate, 3 in. long; leaves broadly ovate or suborbicular, acuminate, apiculate, cordate at base, up to 6 in. in diam., prominently about 14-nerved; capsules globose, glabrous, ·5 in. long; seeds black, the hairs tawny ....11. *campanulata.*

Leaves lobed:—

Leaves emarginately more or less deeply 2-lobed, prostrate herbs of the sea-shore; sepals oblong, obtuse, apiculate, the outer smaller than the inner, ·3–·5 in. long, glabrous; corolla tubular-funnel-shaped, up to 2·5 in. long; leaves thick, fleshy, parallel-nerved, up to 2 in. long, 3·5 in. broad; seeds with golden-brown pubescence, ·3 in. in diam.

12. *Pes-caprae.*

Leaves palmately 3-lobed, sometimes reduced to entire:—

Leaves green beneath, ovate-cordate, the lobes ovate-acuminate, sparsely hairy; calyx-lobes linear or linear-lanceolate, glabrous or strigose-hispid on the base and margins up to 1 in. long; corolla tubular funnel-shaped, up to 2 in. long; seeds glabrous

13. *hederacea.*

Leaves white-woolly beneath:—

Flowers in lax cymes, with stem-clasping bracts and bracteoles, the peduncles and pedicels slender, the whole inflorescence strigose-hirsute; sepals lanceolate acuminate, strongly ciliate, ·5 in. long,

longer in fruit; corolla funnel-shaped, ·75 in. long; leaves ovate cordate, from deeply lobed to entire, up to about 5 in. in diam.; seeds grey-velvety, also with few cottony hairs ....14. *pilosa.*

Flowers in long-peduncled yellow-strigose capitate heads with oblong-lanceolate bracts up to 1 in. long; sepals linear-lanceolate subequal, fulvous-hirsute, ·5–·75 in. long, not longer in fruit; corolla tubular funnel-shaped, 1–1·25 in. long; leaves ovate cordate, from deeply lobed to entire but always sinuate, up to 4 in. in diam.; seeds minutely puberulous .....15. *Wightii.*

Leaves palmatifidly 3–9- (usually 5- or 7-) lobed but variable, sometimes entire, occasionally more or less pedate :—

Flowers in pedunculate capitate heads; leaves rather small and softly hirsute, suborbicular in outline; capsule papery, glabrous; seeds softly grey-velvety, the hairs in small tufts :—

Leaves from ovate-cordate, entire, 1–2 in. in diam., to 3–7-lobed, the lobes ovate, acute, narrowed at base; outer bracts broadly ovate-cordate, strigose, ·75 in. long, inner smaller; sepals unequal, the outer spathulate, inner linear-lanceolate; corolla small, campanulate, ·7 in. long .....16. *bracteata.*

Leaves from entire or dentate to deeply 5–9-lobed, up to 5 in. in diam., the lobes ovate-acuminate, narrowed at base, outer bracts ovate-oblong, hirsute, ·75–1 in. long, inner smaller; sepals unequal, the outer oblong-lanceolate, inner lanceolate-acuminate, all strigose; corolla tubular-campanulate, about 1 in. long

17. *Pes-tigridis.*

Flowers in pedunculate corymbose panicles; leaves large and glabrous, broadly ovate in outline, usually 5–7-lobed :—

Sepals orbicular, obtuse, glabrous, ·3–·4 in. long; corolla widely campanulate, glabrous, 2–3 in. long; leaves 4–6 in. in diam., the lobes ovate lanceolate acuminate; seeds with many long tawny cottony hairs reaching ·25 in. long .....18. *paniculata.*

Sepals elliptic-oblong, obtuse or slightly acute, ·7–1 in. long, glabrous; corolla tubular-campanulate, 2 in. long; leaves 3–5 in. in diam., the lobes lanceolate acuminate; seeds glabrous

19. *Kentrocaulos.*

Leaves digitate, of 5–7 linear or lanceolate leaflets mucronate at tip and 1·5 in. long; sepals elliptic, glabrous, ·3–·4 in. long, scarious on the margins; corolla campanulate, 1·5 in. long; seeds glabrous, shining, glandular, crested .....20. *quinata.*

Leaves pedate, sometimes only palmate or digitate :—

Leaflets toothed, the leaves small, petioles with small stipule-like leaves at their base :—

Leaves normally pedately 5-foliolate, the side-lobes small, the mid-lobe up to 1·5 in. long, spathulate, all serrate; flowers usually solitary, small; sepals lanceolate, cuspidate, rugose on the back, ·2 in. long; corolla tubular, ·3–·5 in. long; capsule glabrous, papery; seeds puberulous ..... 21. *dissecta*.

Leaves pedately 5–7-foliolate, the mid-lobe obovate, about 1 in. long, ·5 in. broad, the side lobes similar but rather smaller, all coarsely serrate, sometimes very narrow; flowers 1–3 but usually solitary on long peduncles; sepals elliptic, mucronate, slightly rugose, ·2–·3 in. long; corolla 3 in. long, the tube long and very slender; capsule glabrous, papery; seeds shortly silky 22. *laciniata*.

Leaflets entire, the leaves fairly large :—

Leaves palmately pedate, 5–7-lobed, the mid-lobe slightly the largest, elliptic-lanceolate, acute, mucronate, up to 2·5 in. long, 1 in. broad, the others smaller and more obtuse, petioles with stipular leaves at their base; sepals ovate, obtuse, ·25 in. long; corolla large, funnel-shaped, up to 2 in. long; capsule ovoid; seeds tawny-pubescent, the margins with long white silky hairs 23. *cairica*.

Leaves pinnatifidly pedate or doubly tripartite, usually 9-lobed, the lobes elliptic or lanceolate, mucronate, up to 2·5 in. long, ·75 in broad, petioles with stipular leaves at their base; sepals ovate obtuse or emarginate, slightly pouched at base, ·3 in. long; corolla-tube cylindric, limb widely spreading, in all 2 in. long; seeds tawny-velvety, the margins with long silky tawny hairs 24. *dasysperma*.

1. IPOMAEA CALYCINA, C. B. Clarke; F. B. I. iv. 201. *Aniseia calycina*, Chois.; Wt. Ic. t. 833.

W. Ghâts, Wynaad, hills of Coimbatore, at 1,000–3,000 ft.

A slender twiner with pink flowers in slender few-flowered cymes.

2. IPOMAEA BARLERIOIDES, Benth. & Hook. f.; F. B. I. iv. 201.

N. Circars, Mahendragiri in Ganjam, Madgol Hills of Vizagapatam, at 3,000–4,000 ft.; W. Ghâts, Mysore and Coimbatore to Tinnevelly Hills, chiefly E. side, at about 4,000 ft.

A trailing hispidly tawny hairy plant of grassy places with large purple corolla.

3. IPOMAEA HISPIDA, Roem. & Sch. *I. eriocarpa*, R. Br.; F. B. I. iv. 204. *I. sessiliflora*, Roth; Wt. Ic. t. 169.

All Districts in the plains and up to 4,000 ft. in the hills, in dry localities.

A slender twining villous plant with small pink flowers.

4. IPOMAEA RUMICIFOLIA, Choisy; F. B. I. iv. 207.

Deccan and Carnatic, usually on black cotton soil.

A trailing annual herb with yellowish or white flowers.

5. IPOMAEA PILEATA, Roxb.; F. B. I. iv. 203; Wt. Ic. t. 1363.

W. Coast, from S. Canara to Travancore; W. Ghâts, Anamalais and hills of Cochin, to about 2,000 ft.

A well-marked annual twining herb with bright pink corolla and conspicuous very softly long hairy involucral bracts.

6. IPOMAEA REPTANS, Poir. *I. aquatica*, Forsk.; F. B. I. iv. 210.

All plains Districts, on the margins of tanks and in other wet places, often floating on the surface, often planted.

An annual or biennial pretty water plant with hollow stems, pink corolla darker in the throat and few-flowered cymes. The young shoots, leaves and roots are eaten. Vern. *Hind.* Kalmi.

7. IPOMAEA REPENS, Lam. *I. Beladamboe*, Roem. & Sch.; F. B. I. iv. 209. *I. rugosa*, Choisy; Wt. Ic. t. 887.

Plains Districts, especially near the coast, trailing and rooting in wet places, on the margins of tanks and back-waters.

A rather thick glabrous plant with purple or white flowers in rather many-flowered cymes. In Tinnevelly specimens the leaves are sometimes very large, deeply lobed both at base and apex.

8. IPOMAEA SEPIARIA, Koen.; F. B. I. iv. 209; Wt. Ic. t. 838.

All plains Districts and to some altitude in the hills, in hedges and by tanks, especially near the coast.

A twining perennial with usually villous stems, the flowers pink with purple tube, the leaves variable, the peduncles and pedicels often thickened in fruit.

9. IPOMAEA OBSCURA, Ker-Gawl.; F. B. I. iv. 207.

All plains Districts, in grass and hedges.

A twining or trailing annual, the flowers yellow or white with a purple tube, the leaves thin, cordate, sometimes pubescent (var. *gemella*, C. B. Clarke), but more often glabrous.

10. IPOMAEA STAPHYLINA, Roem. & Sch.; F. B. I. iv. 210. *I. racemosa*, Roth; Wt. Ill. t. 168.
All forest Districts from Vizianagram southwards, chiefly in hilly country and up to 4,000 ft.
A large straggling or climbing shrub with white flowers purple in the tube.

11. IPOMAEA CAMPANULATA, Linn.; F. B. I. iv. 211; Wt. Ic. t. 1375.
Hills of the Deccan and E. slopes of the W. Ghâts, south to Tinnevelly and S. Travancore, up to 3,000 ft.
A large climber with white or pale rose-coloured flowers, purple in the tube.

12. IPOMAEA PES-CAPRAE, Sweet. *I. biloba*, Forsk.; F. B. I. iv. 212.
Both coasts, on sandy shores and sandy river banks, common. Goat's Foot Creeper.
An extensively creeping and sand-binding plant with a thick long rootstock, handsome purple-red flowers and curious bilobed leaves. Very useful in checking blown sand (see H. Cleghorn in Madr. Journ. i. t. 3). Vern. *Hind.* Dopate luta; *Ur.* Kansarinata; *Mal.* Schovanna.

13. IPOMAEA HEDERACEA, Jacq.; F. B. I. iv. 199.
Deccan and Carnatic, to the E. slopes of the W. Ghâts and up to 3,500 ft., probably introduced and run wild, often cultivated.
A slender climber with retrorsely villous stems, flowers with blue or pink corollas and long sepals. The leaves are sometimes nearly or quite entire, ovate- or orbicular-cordate (var. *integrifolia*, Chois.).

14. IPOMAEA PILOSA, Sweet; F. B. I. iv. 213; Wt. Ic. t. 837.
Deccan and Carnatic, from Anantapur to Tinnevelly, at the E. foot of the W. Ghâts.
An annual climber, very softly hirsute, the flowers rose pink.

15. IPOMAEA WIGHTII, Chois.; F. B. I. iv. 203; Wt. Ic. t. 1364.
N. Circars, hills of Ganjam and Vizagapatam, about 3,000 ft.; W Ghâts, Wynaad and Coimbatore, Nilgiris, Anamalais, Pulneys and hills of Travancore and Tinnevelly, 3,000–6,000 ft.
A climbing strigose undershrub with pink-purple flowers.

16. IPOMAEA BRACTEATA, Wt. Ic. t. 1374; F. B. I. iv. 203.
W. Ghâts, Anamalais and hills of Cochin and Travancore, up to 2,000 ft.
A slender climber, typically with ovate-cordate leaves but more often with lobed ones (var. *lobata*, C. B. Clarke). The corollas are bluish-purple with a darker eye (Fischer).

17. IPOMAEA PES-TIGRIDIS, Linn.; F. B. I. iv. 204; Wt. Ic. t. 836.
All Districts from the N. Circars southwards, especially the dry ones, common on hedges and bushes.
A very hairy climber with white or pink flowers and curiously lobed leaves, cut to about ·5 in. from the top of the petiole, in a rounded sinus.

18. IPOMAEA PANICULATA, R. Br. *I. digitata*, Linn.; F. B. I. iv. 202.
Deccan, probably cultivated and run wild only; W. Coast, from S. Canara to Travancore.
A large perennial climber with pink or red-purple flowers in long-peduncled corymbs of 10–20, fewer in end axils.

19. IPOMAEA KENTROCAULOS, C. B. Clarke; F. B. I. iv. 213.
E. and W. Coasts, scarce.
A stout climber with flowers in few-flowered cymes.

20. IPOMAEA QUINATA, R. Br.; F. B. I. iv. 214.
Hills of Coimbatore, at Tattakarai Ghât, 2,400 ft. (Fischer).
A slender prostrate twiner with white or purplish flowers.

21. IPOMAEA DISSECTA, Willd.; F. B. I. iv. 200.
E. Coast from Masulipatam southwards, on coast sands.
A prostrate perennial herb with small white flowers.

22. IPOMAEA LACINIATA, C. B. Clarke; F. B. I. iv. 200.
Bababudan Hills of Mysore (Law); Mahendragiri Hill in Tinnevelly.
A slender creeper with long-tubed large white flowers. The Tinnevelly specimens are of the form with very narrow lobes to the leaves.

23. IPOMAEA CAIRICA, Sweet. *I. pulchella*, Roth; Wt. Ic. t. 156. *I. palmata*, Forsk.; F. B. I. iv. 214.
Deccan, in various places, probably run wild; much cultivated in gardens. The Railway Creeper.
A beautiful climber with large purple flowers.

24. IPOMAEA DASYSPERMA, Jacq.; F. B. I. iv. 215; Bot. Mag. t. 8788.

Occasional about Madras, probably run wild or cultivated only.

A slender climber with flowers yellow with a purple centre.

Besides the species enumerated, some of which are really garden plants that have apparently run wild, a few others are to be found in cultivation. *I. Batatas*, Poir., is the Sweet Potato, in common cultivation as a vegetable. *I. Learii*, Paxt., is an American species allied to *I. hederacea* with large dark-blue flowers turning to red, often grown on walls and trellises. *I. purpurea*, Roth, also resembling *I. hederacea* and sometimes found run wild, has large flowers with deflexed pedicels, of various shades from white to pale blue or purple and is known as "Morning Glory." *I. carnea*, Jacq., is a straggling, shrubby, S. American species with a rose-purple corolla, common in Madras gardens.

6. Quamoclit, Moench.

Annual twining glabrous herbs. *Leaves* cordate and angled or lobed, sometimes pinnately divided. *Flowers* axillary, in few-flowered cymes; bracts small. *Calyx* of 5 aristate sepals, subequal or the outer rather the smaller. *Corolla* salver-shaped, slightly irregular, the tube slender or slightly funnel-shaped, the limb spreading. *Stamens* 5, much exserted; filaments unequal. *Ovary* glabrous, 4-celled, with 4 ovules; style rather longer than the stamens; stigma 2-globose; pollen-grains spinulose. *Fruit* a 4-celled 1-valved capsule, the septa thin, persistent. *Seeds* 4, black, pubescent or glabrous.

Leaves ovate-cordate, acute, entire or lobed; calyx-lobes acuminate; corolla scarlet or orange; seeds pubescent ..... 1. *phoenicea*.
Leaves deeply pinnately dissected, the segments linear; calyx-lobes elliptic; corolla dark red or white; seeds nearly glabrous .. 2. *pinnata*.

1. QUAMOCLIT PHOENICEA, Choisy. *Ipomaea coccinea*, C. B. Clarke; F. B. I. iv. 199.

   All plains Districts, run wild, introduced from S. America.

   A weak slender twiner.

2. QUAMOCLIT PINNATA, Boj. *Ipomaea Quamoclit*, Linn.; F. B. I. iv. 199.

   All plains Districts, cultivated and run wild, introduced from Tropical America.

7. Calonyction, Choisy.

Large herbaceous climbers; stems often warted. *Leaves* large, cordate, entire or angled. *Flowers* solitary or in few-flowered axillary cymes; bracts caducous. *Calyx* of 5 herbaceous sepals, subequal or the outer smaller, usually aristate. *Corolla* large, glabrous, regular, salver-shaped, white or rose-purple; tube narrow, long, cylindric; limb plicate. *Stamens* 5, exserted; pollen-grains spinulose. *Ovary* 2-celled, 4-ovuled; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule. *Seeds* 4, dull, glabrous.

Corolla white, tube about 3 in. long; stamens exserted; seeds yellow; stout plant ..... 1. *Bona-nox.*
Corolla rose-purple, tube 1–2 in. long; stamens included; seeds black; slender plant ..... 2. *muricatum.*

1. CALONYCTION BONA-NOX, Boj. *Ipomaea Bona-nox*, Linn.; F. B. I. iv. 197.

   Most Districts, in hedges and ravines, wild and cultivated, but perhaps not truly indigenous, Moonflower.

   A large climber with large cordate long apiculate leaves and large white flowers. The flowers, which are sweet-scented, open only at night and are succeeded by a capsule with 4 yellow seeds.

2. CALONYCTION MURICATUM, G. Don. *Ipomaea muricata*, Jacq.; F. B. I. iv. 197.

   East Coast (Wight, Shuter), probably cultivated only; Rampa Hills of Godavari (Narayanswami).

   A slender climber with cordate leaves. The purplish flowers, sometimes white streaked with pink, have thickened peduncles which are sometimes eaten.

8. Lepistemon, BC.

Climbing herbs with villous stems. *Leaves* cordate, often lobed. *Flowers* in very dense axillary cymes; bracts narrow, deciduous. *Calyx* of 5 subequal sepals, acute or obtuse. *Corolla* urceolate, the limb shortly 5-lobed. *Stamens* 5, included; filaments at the base arising from the backs of 5 subequal concave scales arched over the ovary; anthers ovate, pollen grains spinulose. *Disk* large, cupular. *Ovary* 2-celled, ovules 2 in each cell; style very short; stigma capitate. *Fruit* a 4-valved capsule. *Seeds* glabrous.

LEPISTEMON LEIOCALYX, Stapf in Kew Bull. 1895, 113.

W. Ghâts, hills of Travancore near Koni, in secondary forest (Bourdillon); Wynaad, at Nadugani (Lawson).

A villous climber with ovate deeply cordate long acuminate leaves up to 5 in. long, 4 in. broad, and yellow flowers, the calyx-lobes with a few hairs at the base only.

9. Porana, Burm.

Large climbing shrubs. *Leaves* alternate, entire, petioled. *Flowers* white blue or purple, in racemes often much panicled; bracts persistent. *Calyx* of 5 small sepals when in flower, when in fruit the outer or all much enlarged, spreading, prominently ribbed and nerved. *Corolla* campanulate or funnel-shaped, usually small, with a wide or narrow mouth; limb plicate, subentire or lobed. *Stamens* 5, usually included; filaments filiform; pollen grains not spinulose. *Ovary* 1- or 2-celled; ovules 2 or 4; style slender with a single 2-lobed or 2 capitate stigmas. *Fruit* a globose, oblong or obconic, membranous capsule, indehiscent or 2-valved. *Seed* 1, glabrous; cotyledons plicate.

PORANA MALABARICA, C. B. Clarke; F. B. I. iv. 223.

W. Ghâts, from the Bababudan Hills of Mysore to the Nilgiris, Anamalais, Pulneys and hills of Travancore, up to 6,000 ft.

An extensively ramified climber with slender branches, ovate-cordate long-acuminate leaves and white flowers in lax racemes, the papery fruiting sepals elliptic, about ·5 in. long, ·25 in. broad, with 5–7 prominent ribs and prominent reticulation.

P. paniculata, Roxb., a large species common in N. India, is occasionally cultivated in gardens. It has dense masses of white flowers which hang in festoons from its supports. It is sometimes called the Bridal Creeper. *P. volubilis*, Burm., a Malay species, is also common in gardens on both coasts of the Peninsula.

10. Neuropeltis, Wall.

Large climbing shrubs, the shoots and inflorescence rufous-pubescent. *Leaves* alternate, oblong, petioled. *Flowers* in racemes, axillary or subpaniculate towards the ends of the branches; bract under the calyx inconspicuous in flower, much

enlarged in fruit. *Calyx* of 5 subequal suborbicular sepals, scarcely enlarged in fruit. *Corolla* broadly campanulate, deeply 5-lobed, the lobes induplicate-valvate in bud. *Stamens* exserted or included; filaments filiform; anthers oblong. *Ovary* imperfectly 2-celled, 4-ovuled; styles 2, separate from the base, shortly linear; stigmas large, globose. *Fruit* a globose 4-valved 1-seeded capsule, sessile or shortly stalked in the middle of the flat enlarged bract. *Seed* globose, glabrous, albuminous, the cotyledons plicate.

NEUROPELTIS RACEMOSA, Wall.; F. B. I. iv. 225; Bedd. Ic. t. 291.

W. Ghâts, Tambacheri Ghât in Malabar (Beddome).

A large climber with conspicuous peltate bracts in fruit, the leaves elliptic-oblong, up to 4·5 in. long, rufous-pubescent when young, afterwards nearly glabrous.

11. Cressa, Linn.

Small erect branching undershrubs, grey-pubescent. *Leaves* small, entire. *Flowers* small, sessile in the upper axils or in terminal spikes or clusters. *Calyx* of 5 subequal imbricate sepals. *Corolla* small, funnel-shaped, the tube short; lobes 5, ovate, imbricate in bud. *Stamens* 5, exserted; filaments filiform. *Ovary* 2-celled, ovules 2 in each cell; styles 2, distinct; stigmas capitate. *Fruit* a 2–4-valved capsule 1–4-seeded. *Seeds* glabrous; cotyledons linear, plicate.

CRESSA CRETICA, Linn.; F. B. I. iv. 225.

Dry plains Districts, on sandy plains, fallow fields and black cotton soil.

A small dwarf shrub up to 15 in. high, very grey, the corolla white, the small leaves elliptic, acute.

12. Evolvulus, Linn.

Small herbs or undershrubs, prostrate or erect, usually silky-pubescent. *Leaves* small, entire, often distichous. *Flowers* small, white blue or pink, solitary or in few-flowered pedunculate cymes. *Calyx* of 5 subequal sepals, not enlarging in fruit. *Corolla* rotate or funnel-shaped; limb plicate, subentire. *Stamens* 5, included or exserted; filaments filiform; anthers ovate or oblong. *Ovary* 2- rarely 1-celled; ovules 4; styles 2, distinct from the base, each cleft into 2 linear or subclavate branches, stigmatic on the inner

face. *Fruit* a 4–2-valved capsule. *Seeds* 4 or 2, rarely solitary, glabrous; cotyledons twice folded.

EVOLVULUS ALSINOIDES, Linn.; F. B. I. iv. 220.

All plains Districts, on open ground, by roadsides and in other dry grassy places, common.

A perennial herb with a woody root-stock and many spreading prostrate wiry branches, the flowers light blue, the leaves variable, lanceolate oblong ovate or even suborbicular, the hairiness also variable, in one form (*E. hirsutus*, Lamk.) fulvous-hirsute.

13. Breweria, R. Br.

Herbs or undershrubs or shrubs, erect or climbing. *Leaves* entire. *Flowers* in axillary peduncled heads or terminal close panicles or 1–3 together; bracts small. *Calyx* of 5 equal or unequal sepals, scarcely enlarged in fruit. *Corolla* campanulate or funnel-shaped; limb 5-plaited or shortly and broadly lobed. *Stamens* included; filaments filiform, often dilated at base. *Ovary* 2-celled; ovules 4; styles filiform, free from the base or united to about the middle and then equally or unequally 2-lobed; stigmas capitate. *Capsule* globose or ovoid, 4-valved, membranous or coriaceous. *Seeds* normally 4, often less, glabrous or nearly so.

Climbing shrub; leaves large, up to about 4 in. long, ovate-cordate, fulvous-tomentose; flowers large, in pedunculate rather stout cymes; styles united to nearly half their length .....1. *cordata.*
Erect rigid undershrub; leaves very small, under ·5 in. long, oblong, nearly glabrous; flowers small, 1–3 together on slender pedicels or nearly sessile; styles distinct from the base .....2. *evolvuloides.*

1. BREWERIA CORDATA, Blume; F. B. I. iv. 223. *B. Roxburghii*, Wt. Ic. t. 1370.

   N. Circars, forests of Godavari; W. Ghâts, Anamalais and hills of Travancore.

   A large densely pubescent or tomentose climber with white flowers.

2. BREWERIA EVOLVULOIDES, Choisy; F. B. I. iv. 224. *Seddera evolvuloides*, Wt. Ic. t. 1369.

   Carnatic, coast region of Tinnevelly and S. Travancore.

   An erect branching undershrub, with small white, usually solitary, axillary flowers.

14. Hewittia, W. & A.

A pubescent twining herb. *Leaves* ovate, cordate, entire angled or lobed. *Flowers* axillary, solitary or in few-flowered cymes; bracts 2, below the calyx, linear-lanceolate. *Calyx* of 5 unequal large sepals, the 3 outer large, ovate, decurrent, enlarged in fruit, the 2 inner smaller, lanceolate, unaltered. *Corolla* widely campanulate, yellow or white with a purple eye, silky pubescent without; limb plicate. *Stamens* 5, included; filaments linear, dilated at the base; pollen-grains smooth. *Ovary* with long white silky erect hairs, 1- or imperfecly 2-celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. *Fruit* a globose, 4-valved, 1-celled, normally 3-seeded capsule. *Seeds* black, glabrous.

HEWITTIA BICOLOR, W. & A.; F. B. I. iv. 216; Wt. Ill. t. 168, Ic. t. 835.

N. Circars, Godavari; W. Coast, Malabar and Cochin.

A climber with angled or palmately lobed leaves up to about 4 in. long, a conspicuous calyx and very thin-walled capsule.

15. Aniseia, Choisy.

Twining herbs. *Leaves* ovate or oblong, often mucronulate. *Flowers* axillary, solitary or in few-flowered cymes. *Calyx* of 5 herbaceous sepals, the 3 outer large ovate, decurrent on the peduncle, enlarged in fruit, the 2 inner lanceolate, not enlarged in fruit. *Corolla* widely tubular campanulate or funnel-shaped; limb subentire. *Stamens* 5, included; filaments filiform. *Ovary* 2-celled, 4-ovuled; style filiform, stigma 2-globose. *Fruit* a 2-celled, 4-valved capsule. *Seeds* 4, black, smooth.

ANISEIA UNIFLORA, Choisy; Wt. Ic. t. 850. *Ipomaea uniflora*, Roem. & Sch.; F. B. I. iv. 201.

E. Coast, near Negapatam (Wight); W. Coast, in Travancore, margins of tanks and backwaters.

A prostrate herb, with many fibrous roots from the stems rooting in mud. Leaves long-petioled, elliptic-oblong, often emarginate and mucronate at apex, cuneate at base, up to 3 in. long, 1 in. broad; corolla white; calyx-lobes greenish-white.

16. Convolvulus, Linn.

Herbs or undershrubs, erect prostrate or twining, sometimes spinescent. *Leaves* entire, toothed or lobed. *Flowers* axillary,

solitary or in few-flowered cymes; bracts usually narrow. *Calyx* of 5 usually subequal sepals. *Corolla* campanulate or funnel-shaped; limb plicate, nearly entire. *Stamens* included; filaments usually unequal. *Ovary* 2-celled; ovules 4; style filiform; stigmas 2, linear or oblong, distinct. *Fruit* a globose capsule, 2-celled, 4-valved or breaking irregularly. *Seeds* normally 4, glabrous, smooth or minutely tuberculate.

Erect undershrub, silky-villous with tawny hairs; flowers 1–3 in a lax raceme; sepals ovate, acuminate; corolla tubular, under ·5 in. long, villous on parts exposed in bud, shortly 5-lobed; leaves linear, narrow, up to 2 in. long ..... 1. *Rottlerianus.*

Twining herbs:—

Glabrous or slightly pubescent; peduncles 1–3-flowered; sepals obtuse, nearly glabrous; corolla broadly funnel-shaped, about 1 in. broad; leaves linear- or triangular-oblong, hastate at base, up to 2 in. long 2. *arvensis.*

More or less rusty-pubescent; peduncles 1–5-flowered, sepals acuminate, pubescent; corolla small, tubular-funnel-shaped, about ·5 in. broad; leaves triangular-hastate or cordate, deeply lobed and toothed, up to 3 in. long, 1·5 in. broad ..... 3. *flavus.*

1. CONVOLVULUS ROTTLERIANUS, Choisy; F. B. I. iv. 219.
   Deccan, in Western Districts, Bellary to Coimbatore, in dry grass lands.
   A perennial, up to about 2–3 ft. high.
2. CONVOLVULUS ARVENSIS, Linn.; F. B. I. iv. 219.
   Deccan and hills of W. Ghâts, a weed of cultivation. Bindweed.
   A trailing or twining herb with pink or white flowers.
3. CONVOLVULUS FLAVUS, Willd.; F. B. I. iv. 219. *C. rufescens*, Choisy; Wt. Ic. t. 1365.
   W. Ghâts, Nilgiris, hills of Coimbatore, Pulneys, at 3,000–6,000 ft.
   A climbing plant with yellowish flowers.

17. Jacquemontia, Choisy.

Climbing herbs or undershrubs, usually pubescent. *Leaves* elliptic or cordate, entire or rarely toothed or lobed. *Flowers* in axillary compound umbellate or capitate cymes, rarely solitary; bracts small. *Calyx* of 5 equal or unequal sepals. *Corolla* small, tubular or funnel-shaped; limb plicate, the vertical bands ending

in 2 distinct nerves. *Stamens* 5, included. *Ovary* glabrous, 2-celled; ovules 4; style filiform; stigmatic lobes 2, linear or elliptic-oblong. *Fruit* a globose 8-valved rarely 4-valved, 2-celled capsule. *Seeds* normally 4, glabrous or minutely rugose, sometimes slightly winged marginally.

JACQUEMONTIA PANICULATA, Hallier f. *Convolvulus paniculatus*, Vahl; F. B. I. iv. 220.

Most plains Districts and up to 3,000 ft. in the hills.

A slender climber with pink or white flowers, ovate or cordate long-acuminate leaves up to about 2·5 in. in diam., and globose capsules with 4 seeds which are trigonous, slightly winged, and often minutely rugose.

J. caerulea, Choisy, is a pretty blue-flowered climber, common in gardens in the plains. It is an introduction from S. America.

18. Merremia, Dennst.

Herbs or shrubs, usually climbing, sometimes erect or prostrate. *Leaves* alternate, entire or lobed. *Flowers* axillary, solitary or in cymes and usually with long peduncles. *Calyx* of 5 unequal sepals, various in shape. *Corolla* campanulate or funnel-shaped, usually white or yellow, the vertical bands defined by violet lines; limb plicate, the margin slightly lobed. *Stamens* 5, unequal, included or exserted; filaments filiform, often villous at the base; anthers usually twisted; pollen with longitudinal folds, not spinulose. *Ovary* 2–4-celled; ovules 4; style filiform; stigma 2-globose. *Fruit* a 4-valved capsule; 1–4-celled, the style sometimes separating with a small operculum. *Seeds* 4, dull, glabrous or rarely puberulous or with long hairs, cotyledons crumpled.

Corolla more or less hairy externally; seeds hairy :—

Seeds with long recurved spreading hairs; sepals ·3 in. long; corolla villous near the apex, 1–1·5 in. long; cymes subumbellate; capsules globose; leaves ovate- or oblong-lanceolate, acute or acuminate, rounded or cordate or hastate at base, up to 3 in. long, 2 in. broad, glabrous or pubescent ..... 1. *umbellata.*

Seeds minutely velvety, the margins almost villous; sepals ·5–·7 in. long; corolla densely shaggy without, 1·5–2 in. long; cymes subracemose; capsules ovoid; leaves broadly ovate, acute, truncate or subcordate at base, up to 4 in. in diam., glabrous ..... 2. *crispatula.*

Corolla glabrous externally :—

Corolla large, more than 1 in. long :—

Leaves palmately 5-lobed, occasionally 7-lobed, the lobes triangular-**acuminate,** the margins often dentate, more or less long-hairy, up to **6 in. in diam.** ; flowers in pedunculate cymes of 1–7 ; sepals ·5–·75 **in. long, elliptic,** obtuse ; corolla yellow, 1–2 in. long
3. *vitifolia.*

Leaves digitate, leaflets 5, lanceolate, acuminate at both ends, **subsessile,** up to 4 in. long, 1·5 in. broad, hirsute ; flowers in long-**peduncled** laxly dichotomous cymes with yellow strigose hairs ; **sepals** ·7 **in. long,** elliptic-oblong, unequal, enlarged in fruit and very **strigose** ; corolla white, 1 in. long .....4. *aegyptia.*

Leaves pedately 7-lobed, up to 8 in. in diam., the leaflets lanceolate, **deeply and** prominently toothed, glabrous ; flowers large, in long-**peduncled** few-flowered cymes ; sepals elliptic-ovate, acute, glabrous, **1 in. long,** enlarged in fruit ; corolla 1·5 in. long ; seeds large, **glabrous** .....5. *dissecta.*

Corolla small, under 1 in. long :—

Sepals long-ciliate, the inner 3 larger and deeply emarginate, nearly ·25 **in. long,** the outer 2 apiculate, shorter ; corolla campanulate, ·25 **in. long** ; stems creeping and rooting at the nodes ; leaves **reniform** or ovate-cordate, toothed, usually broader than long but **under 1 in.** in diam.....6. *emarginata.*

Sepals not ciliate, the inner ones not emarginate ; stems not rooting **at the nodes** :—

Flowers 1–3 together on axillary peduncles ; seeds glabrous :—

Peduncles short, under 1 in. long ; sepals elliptic, mucronate, **glabrous** ; corolla campanulate, about ·4 in. long ; leaves **variable,** linear-hastate or oblong-obovate, the former usually **acute,** the latter obtuse and 3-toothed, all auricled at the base **and toothed,** up to 1 in. long .....7. *tridentata.*

Peduncles long, often 3 in. long ; sepals lanceolate acuminate, **glabrous** ; corolla campanulate, ·6–·8 in. long ; leaves linear-**oblong, hastate** and toothed at base on the auricles, acute **and** mucronate at apex, up to 3 in. long, ·5 in. broad
8. *hastata.*

Flowers in rather dense axillary dichasioid cymes ; sepals truncate **and** cucullate, obtuse or apiculate, spreading later and then en-**larged** and often wrinkled ; corolla campanulate, ·35 in. long : **leaves** ovate, sometimes 3-lobed, entire or coarsely toothed, **acute** and apiculate, deeply cordate at base, up to 3 in. long ; **seeds** pubescent.....9. *chryseides.*

1. MERREMIA UMBELLATA, Hallier f. *Ipomaea cymosa*, Roem. & Sch.; F. B. I. iv. 211.
   N. Circars, E. Ghát Hills to the Godavari, up to 4,000 ft.; Deccan, Kambakam Hill in Chingleput (leaves hastate); W. Ghâts, in all Districts up to 4,000 ft.
   A very variable climber as regards hairiness and shape of leaves, the flowers white or cream-coloured.
2. MERREMIA CRISPATULA, Prain. *Ipomaea petaloidea*, Choisy; F. B. I. iv. 212.
   N. Circars, in Godavari (Gamble).
   A large climber with large leaves and yellow flowers.
3. MERREMIA VITIFOLIA, Hallier f. *Ipomaea vitifolia*, Sweet; F. B. I. iv. 213.
   All plains Districts and up to 3,000 ft. in the hills, common.
   A perennial twining plant with yellow flowers, globose capsules and glabrous seeds, the stems and leaves with deciduous hairs.
4. MERREMIA AEGYPTIA, T. Cooke Fl. Bomb. ii. 240 *in note*. *Ipomaea pentaphylla*, Jacq.; F. B. I. iv. 202. *Batatas pentaphylla*, Wt. Ic. t. 834.
   N. Circars, Deccan, Carnatic and W. Coast, occasional.
   An annual twining plant with white flowers, ovoid papery capsules and glabrous seeds.
5. MERREMIA DISSECTA, Hallier f. *Ipomaea sinuata*, Ortega; F. B. I. iv. 214.
   Deccan, Carnatic and W. Coast, in various places, a tropical American species now run wild.
   A twining plant with glabrous or hirsute stems and pretty flowers, white or pink with a purple throat.
6. MERREMIA EMARGINATA, Hallier f. *Ipomaea reniformis*, Choisy; F. B. I. iv. 206.
   N. Circars, Deccan and Carnatic, up to 3,000 ft. in the hills, in damp places and on black cotton soil.
   A creeping and rooting herb with yellow flowers and globose small capsule.
7. MERREMIA TRIDENTATA, Hallier f. *Ipomaea tridentata*, Roth; F. B. I. iv. 205.
   All plains Districts.
   A perennial herb with thick rootstock giving off many

elongate prostrate slender branches, the flowers pale yellow, the capsules globose.

8. **Merremia hastata**, Hallier f. *Ipomaea angustifolia*, C. B Clarke; F. B. I. iv. 205, *not of* Jacq.

East and West Coast Districts, apparently scarce inland.

A biennial twining herb with thick rootstock giving off slender branches, the flowers creamy-yellow or white, the capsules depressed-globose.

9. **Merremia chryseides**, Hallier f. *Ipomaea chryseides*, Ker-Gawl.; F. B. I. iv. 206; Wt. Ic. t. 157.

All plains Districts and up to 3,000 ft. in the hills, common.

A branched climbing herb, often with rough stems and variable leaves, the flowers yellow.

19. Operculina, Silva Manso.

Large climbing herbs, stems petioles and peduncles often winged. *Leaves* large, entire or lobed, rarely peltate. *Flowers* large, axillary, solitary or in few-flowered cymes; bracts oblong, deciduous. *Calyx* of 5 large ovate glabrous sepals, enlarging and thickening in fruit, at length splitting irregularly from the tip. *Corolla* funnel-shaped, rarely campanulate, the tube with 5 vertical smooth bands. *Stamens* 5; filaments filiform, broadening at base; anthers large, at length twisted. *Ovary* glabrous, 2-celled, 4-ovuled; style filiform; stigma 2-globose. *Fruit* a capsule, the epicarp circumscissile above the middle, the cap carrying away the style, sometimes irregularly splitting. *Seeds* large, often solitary, black, smooth; radicle large.

Operculina Turpethum, Silva Manso, Enum. Subst. Braz. 16, 49. *Ipomaea Turpethum*, R. Br.; F. B. I. iv. 212.

N. Circars, common in Godavari; Deccan and Carnatic to S. Travancore, occasional.

A stout climber with white flowers and leaves very variable in shape, ovate or oblong, entire or lobed truncate or cordate at base. In fruit the enlarged sepals and thickened pedicels are conspicuous.

20. Erycibe, Roxb.

Scandent or rambling shrubs, rarely trees. *Leaves* alternate, entire, coriaceous. *Flowers* small, in axillary or terminal racemose

or panicled cymes; bracts small, lanceolate. *Calyx* 5-lobed, the lobes orbicular, coriaceous, appressed to the base of the fruit. *Corolla* white or yellowish, subrotate, the tube villous without; lobes 5, deeply obcordate and so seemingly 10, contorted in bud, margins entire or crenate. *Stamens* 5, on the corolla-throat; filaments short; anthers ovate-lanceolate. *Ovary* 1-celled, with 4 erect ovules; style 0; stigma subglobose, 5- or 10-ridged. *Fruit* an ovoid or ellipsoid fleshy berry. *Seed* solitary, glabrous; albumen scanty, irregularly intruded between the folds of fleshy plicate cotyledons; radicle large, inferior.

Corolla yellowish; leaves elliptic-oblong or obovate, abruptly sharply acuminate, base attenuate, up to 5 in. long, 2 in. broad, the petiole ·3–·5 in. long; cymes axillary or in terminal panicles; berry ·5 in. long, ellipsoid ..... 1. *paniculata*.

Corolla white; leaves elliptic or obovate, sometimes almost orbicular, sometimes even lanceolate, abruptly and usually obtusely acuminate, base cuneate or rounded, up to 4 in. long, 2 in. broad, the petiole ·25 in. long; cymes axillary and elongate or in terminal panicles; berry ·5 in. long, ovoid ..... 2. *Wightiana*.

1. ERYCIBE PANICULATA, Roxb. Cor. Pl. t. 159; F. B. I. iv. 180, Wt. Ill. t. 180.

   N. Circars, hills of Ganjam to Godavari, in forest ravines at low levels; occasional in Mysore and Malabar.

   A large climbing shrub, the branches, inflorescence and young leaves with much rusty tomentum, the leaves dull above and not strongly reticulate beneath. Bark brown with large corky lenticels; wood soft, porous, of peculiar structure. Vern. *Ur.* Katapergu.

2. ERYCIBE WIGHTIANA, Grah.; Hallier f. Bull. Herb. Boiss. v. 737. *E. paniculata*, Roxb. var. *Wightiana*, C. B. Clarke; F. B. I. iv. 181.

   W. Coast and W. Ghâts, from S. Canara and Mysore southwards, up to about 4,000 ft.

   A large climbing shrub, rusty-tomentose like the preceding, the flowers very fragrant, the leaves shining above, prominently reticulate beneath.

21. Cuscuta, Linn.

Leafless twining parasitic herbs, yellow or reddish. *Flowers* small, white or rose-coloured, sessile or shortly pedicelled, solitary

or in lateral fascicles or short racemes; bracts small or 0. *Calyx* of 5 (or 4) subequal sepals, free or connate at the base. *Corolla* ovoid globose or campanulate, usually with a ring of fimbriate or lobed scales near the base or below the stamens, sometimes wanting; lobes 5 (or 4) short, imbricate. *Stamens* as many as the corolla lobes, inserted on or below the throat of the corolla; filaments linear; anthers oblong, exsert. *Ovary* more or less completely 2-celled; ovules 4; styles 1 or 2; stigmas 2. *Fruit* a globose or ovoid, dry or succulent capsule, circumscissile or irregularly breaking up; seeds 4-2. *Seeds* glabrous, albumen fleshy; embryo slender, spiral, the cotyledons obscure.

Style 1, short, stout, stigmas 2, ovoid, acute, diverging; branches stout, fleshy; scales at the base of the corolla; capsule succulent ....1. *reflexa*.
Styles 2, distinct, elongate, stigmas capitate; branches filiform; capsule dry, papery :—
Scales on the corolla-tube 0; sepals ovate-acuminate; corolla-lobes long-acuminate; seeds with few minute lines .....2. *hyalina*.
Scales on the corolla-tube below the stamens fimbriate; sepals deltoid; corolla-lobes shortly acuminate; seeds very minutely rugose 3. *chinensis*.

1. CUSCUTA REFLEXA, Roxb. Cor. Pl. t 104; F. B. I. iv. 225.
   All plains Districts and up to 6,000 ft. in the hills of the Nilgiris and Pulneys.
   A stout-branched, yellow, much intertwining plant, parasitic on many species of shrubs or trees and sometimes almost completely covering them.
2. CUSCUTA HYALINA, Roth; F. B. I. iv. 226; *C. arabica*, Wt. Ic. t. 1371.
   Deccan and Carnatic.
   A very slender-stemmed parasite, recorded as growing on *Amaranthus*, *Polygonum*, *Tribulus*, *Trianthema*, etc.
3. CUSCUTA CHINENSIS, Lamk.; F. B. I. iv. 226; Wt. Ic. t. 1373. *C. hyalina*, Wt. Ic. t. 1372, *not of* Roth.
   Carnatic.
   A very slender-stemmed parasite, found on *Ipomaea Pescapræ* and other plants, but apparently scarce.

Family CVI. SOLANACEAE.

Herbs or shrubs erect or climbing or rarely small trees. *Leaves* alternate, often in unequal pairs, rarely clustered, never truly

opposite, entire lobed or pinnatifid; stipules 0. *Flowers* regular, hermaphrodite or rarely dioecious, in terminal or lateral axillary or extra-axillary cymes or on solitary or clustered pedicels; bracts and bracteoles 0. *Calyx* inferior, limb usually 5-lobed or -toothed, usually persistent, often accrescent in fruit. *Corolla* funnel-shaped campanulate or rotate, often plicate; lobes 5, rarely 10 or the limb subentire. *Stamens* 5, on the corolla-tube; anthers ovate or oblong, dehiscing by apical pores or longitudinally. *Ovary* 2-celled or imperfectly 1- or 4-celled, rarely 3–5-celled; ovules many, on prominent peltate placentas; style linear; stigma capitate or very shortly lobed. *Fruit* a berry or a circumsciss or valvate capsule, usually 2-celled, many-seeded. *Seeds* compressed discoid or subreniform; testa usually crustaceous; albumen fleshy; embryo peripheric with linear cotyledons or rarely straight.

Fruit indehiscent, a berry :—

Anthers connivent in a cone, longer than the filaments :—

Anthers dehiscing by apical pores or short slits; leaves entire lobed or pinnatifid ..... 1. **Solanum.**

Anthers dehiscing introrsely by longitudinal slits, the tips empty; leaves pinnatisect ..... **Lycopersicum.**

Anthers not connivent in a cone, not longer than the filaments, dehiscing by lateral slits :—

Calyx in fruit small, the flowers solitary or in pairs .... **Capsicum.**

Calyx in fruit enlarged, overtopping the berry :—

Pedicels solitary; corolla broadly campanulate, the lobes plicate in bud; leaves pubescent or glabrous :—

Calyx in fruit inflated, shortly lobed ..... 2. **Physalis.**

Calyx in fruit deeply cleft, much enlarged, 5-angled .. **Nicandra.**

Pedicels clustered; corolla narrowly campanulate, the lobes valvate in bud; leaves and stems stellate-tomentose 3. **Withania.**

Fruit capsular :—

Flowers axillary, solitary: corolla-lobes plicate; embryo curved 4. **Datura.**

Flowers in terminal panicles; corolla-lobes induplicate-valvate; embryo straight ..... **Nicotiana.**

1. Solanum, Linn.

Herbs or shrubs, sometimes subscandent, rarely small trees, unarmed or prickly. *Leaves* alternate or subopposite, entire

lobed or pinnatifid. *Flowers* in dichotomous or racemose, lateral or terminal cymes. *Calyx* 5–10-lobed, rarely 4-lobed or subentire, accrescent or not in fruit. *Corolla* rotate, rarely campanulate; tube short; limb plicate, usually 5-lobed. *Stamens* 5, rarely 4 or 6, attached to the throat of the corolla; filaments short; anthers oblong, often narrowed upwards, connivent in a cone, opening by terminal pores or short slits. *Ovary* 2-, rarely 3–4-celled; style columnar; stigma small. *Fruit* a globose or elongated berry. *Seeds* very many, small, usually discoid; testa crustaceous, often pitted; albumen fleshy; embryo peripheric, the cotyledons linear, radicle terete.

Unarmed :—

Roots mixed with tubers; stems herbaceous, faintly angular; leaves pinnatifid; flowers large, blue or white ..... *tuberosum.*

Roots not mixed with tubers :—

Annual herb; flowers white, in axillary or lateral umbellate cymes; leaves thin, glabrous, ovate-lanceolate, acute or acuminate, entire or sinuate-toothed; berry globose, ·25 in. in diam., black but sometimes red or yellow, shining; seeds discoid, minutely pitted 1. *nigrum.*

Perennial shrubs or undershrubs :—

Densely stellately tomentose; flowers in lateral or axillary though often apparently terminal cymes :—

Flower cymes corymbose, corolla white; calyx cup-shaped, ·25 in. long, lobes short, deltoid; leaves velvety-tomentose, tawny beneath, elliptic-lanceolate, acuminate, up to 10 in. long, 5 in. broad, entire; berry yellow, globose, with few stellate hairs, ·3 in. in diam.; seeds minutely papillose-scaly 2. *verbascifolium.*

Flower cymes racemose, corolla purple; calyx ·2 in. long, deeply lobed, lobes lanceolate, acuminate; leaves rather sparsely stellate-tomentose, ovate, subacute, rhomboid or slightly cordate at base, up to 4 in. long, 2·5 in. broad, entire or sinuately lobed; berry red, glabrous, globose, shining, ·3 in. in diam.; seeds scaly ..... 3. *pubescens.*

Sparsely stellately pubescent or glabrous or pilose; corolla white :—

Flowers in extra-axillary pedunculate racemose cymes; calyx-lobes linear-lanceolate, acuminate, stellate-pubescent, ·15–·2 in. long; corolla deeply lobed, the lobes oblong, ·35 in. long, recurved; leaves elliptic-lanceolate, acute at both ends,

repand-sinuate, long-petioled, up to 5 in. long. 2 in. broad; seeds flat, ·15–·2 in. long, slightly scaly .....4. *vagum.*

Flowers axillary, solitary or in sessile umbels, seeds angular, reticulately pitted; leaves with usually unequal pairs :—

Calyx glabrous or nearly so, entire or with reflexed protuberances outside the margin or with 5 subulate teeth, saucer-shaped in fruit; branchlets usually quadrangular, often zigzag; leaves membranous, elliptic-lanceolate, long-acuminate, up to 9 in. long, 3 in. broad, slightly setose above or glabrous; berries yellow or red .....5. *laeve.*

Calyx pilose with 5–10 short teeth, which are usually reflexed in fruit; branchlets usually round, sometimes zigzag; leaves membranous, elliptic-lanceolate, acuminate, up to 6 in. long, 2 in. broad, very pilose when young, sparsely so when old, often with few prominent acute teeth on the upper half; berries red .....6. *denticulatum.*

Armed with prickles :—

Erect herbs, shrubs or small trees :—

Leaves entire, not prickly, prickles only on the stem; leaves oblong, oblanceolate, abruptly acuminate, up to 12 in. long, 4 in. broad, glabrous above when mature, densely white-stellate-tomentose beneath; flowers in dense stellately-woolly lateral or subterminal corymbose cymes; calyx-lobes triangular; corolla pale blue-purple, small, ·3 in. long; berry glabrous, ·3 in. in diam.; seeds flat, minutely dotted .....7. *giganteum.*

Leaves sinuately or pinnatifidly lobed :—

Lobes shallow, few :—

Corollas over 2 in. in diam., blue, the flowers in axillary umbels of 1–3 on very short peduncles, the long pedicels deflexed in fruit; stamens unequal (3 long, 2 short); leaves ovate, acute at apex, cordate at base, softly tawny pubescent, up to 4 in. long, 2 in. wide; prickles on stems, petioles and leaves few and small; berry globose, enclosed in accrescent calyx; seeds flat, reticulate 8. *Wightii.*

Corollas under 2 in. in diam., the flowers in axillary or lateral racemes or corymbose cymes :—

Flowers white; calyx not enlarging in fruit; berry globose; style glabrous; seeds small, flat, nearly smooth :—

Berry large, 1–1·5 in. in diam., densely covered with yellowish needle-like hairs; cymes few-flowered; corolla ·75 in. in diam., densely stellate-strigose without; leaves ovate or subrectangular in outline with large triangular

lobes, densely fulvous stellately woolly, up to 18 in. long, 12 in. broad; prickles many, on stems, petioles and leaf-nerves .....9. *ferox.*

Berry small, ·3 in. in diam, smooth; cymes corymbose, many-flowered; corolla ·75 in. in diam., stellate-pubescent without; leaves ovate or subrectangular in outline, acute, often cordate at base, with few large triangular lobes, softly fulvous-tomentose, up to 9 in. long, 7 in. broad; prickles very few, on stem and petioles only

10. *torvum.*

Flowers blue; berry smooth; corolla sparsely pubescent; style stellately villous; seeds minutely pitted:—

Racemes few-flowered; calyx-lobes lanceolate, enlarging in fruit, in wild forms often prickly; leaves ovate, few-sinuate, unequal and acute or subcordate at base, up to 6 in. long, 4 in. broad in cultivated, 4 in. long, 2 in. broad in wild forms, softly stellately-pubescent; prickles few in cultivated, many in wild form, on stem, leaves and calyx

11. *Melongena.*

Racemes many-flowered; calyx-lobes triangular, often prickly, not enlarging in fruit; leaves variable, normally few-sinuately lobed but sometimes deeply lobed or pinnatifid, stellately woolly beneath, usually less so above, up to 6 in. long, 4 in. broad; prickles many, stout, curved, on stem and leaves; berry globose, ·3 in. in diam.

12. *indicum.*

Lobes deep, many:—

Calyx-tube inflated in fruit, deeply cup-shaped, ultimately reflexed; flowers racemose, white or pale blue; leaves oblong-lanceolate in outline, deeply pinnatifid or twice pinnatifid, up to 8 in. long, 4 in. broad, softly stellate-pubescent; prickles very numerous, yellowish, straight and sharp, on stem, leaves and calyx; berry globose, 1 in. in diam., yellow, smooth; seeds large, pitted .....13. *sisymbriifolium.*

Calyx-lobes not or only slightly inflated in fruit, ovate or lanceolate, abruptly acute; flowers in few-flowered cymes, blue-purple; leaves ovate or elliptic, acute, pinnatifid half-way down, sometimes only sinuate, up to 4 in. long, 2 in. broad, sparsely stellate-pubescent to nearly glabrous; prickles very numerous, yellow, straight, often ·5 in. long, on stems, leaves and calyx; berry globose, yellow or white with green blotches, ·5–·75 in. in diam.; seeds small, smooth ..14. *xanthocarpum.*

Climbing undershrubs, the stems with very numerous short strong recurved prickles; leaves ovate in outline, sinuate or 3–5-lobed, obtuse, truncate or subcordate at base, up to 3 in. long, 1·5 in broad, nearly glabrous; cymes lateral with short peduncles and long pedicels, about 2–8-flowered; calyx-lobes ovate, acuminate, prickly; corolla large, white to purple; berry globose, scarlet, smooth, ·3 in. in diam.; seeds flat, slightly pitted .....15. *trilobatum.*

1. SOLANUM NIGRUM, Linn.; F. B. I. iv. 229. *S. rubrum*, Roxb.; Wt. Ic. t. 344.

   All Districts and at all elevations, a cosmopolitan weed of roadsides and cultivated land.

   An erect annual herb.

2. SOLANUM VERBASCIFOLIUM, Linn.; F. B. I. iv. 230; Wt. Ic. t. 1398.

   All Forest Districts, usually in ravines or shady places under big trees.

   A large shrub or small tree up to 20 ft. high. Bark grey, smooth; wood soft, light yellow.

3. SOLANUM PUBESCENS, Willd.; F. B. I. iv. 230; Wt. Ic. t. 1402.

   Deccan and Carnatic to the E. slopes of the W. Ghâts in open scrub forest on arid soil, up to 3,000 ft.

   A usually low, but occasionally large, shrub, up to 6 ft. high (15 ft. or more, *Wight*); the flowers in loose racemes.

4. SOLANUM VAGUM, Heyne; F. B. I. iv. 230.

   W. Ghâts, hills of Tinnevelly, probably at 4,000–6,000 ft.

   A glabrescent shrub with white flowers.

5. SOLANUM LAEVE, Dunal; F B. I. iv. 231. *S. bigeminatum*, Nees; F. B. I. iv. 231.

   N. Circars, Madgol Hills of Vizagapatam at 3,000 ft. (A. W. Lushington); W. Ghâts, in all Districts in evergreen forests, up to 6,000 ft.

   A straggling undershrub with variable calyx-teeth, always, however, saucer-shaped in fruit.

6. SOLANUM DENTICULATUM, Blumé; F. B. I. iv. 231; Wt. Ic. t. 1397.

   Hills of the Carnatic; W. Ghâts, in Nilgiris and Pulneys up to 7,000 ft., chiefly in moist places.

   A shrub reaching 6 ft. in height but weak and scarcely

woody. The leaves have sometimes prominent angular lobes (var. *Gouakai*, C. B. Clarke).

7. SOLANUM GIGANTEUM, Jacq.; F. B. I. iv. 233; Wt. Ic. t. 893.

N. Circars, hills of Vizagapatam to 4,000 ft. (A. W. Lushington); Deccan, in hilly country of Mysore and Coimbatore, to 5,000 ft.; W Ghats, in almost all Districts, above 4,000 ft.

A large shrub or small tree, reaching a height of even 25 ft., easily known by the dense white stellate tomentum covering the whole plant except the upper surface of the leaves, the stem prickles conical, quite small. The berries are red.

8. SOLANUM WIGHTII, Nees; F. B. I. iv. 234; Wt. Ic. t. 841.

W Ghats, E. side of Nilgiris at 4,000–6,000 ft.; hills of Coimbatore at 4,500 ft. (Fischer).

An erect herbaceous plant with handsome large blue flowers with angular lobes, the calyx-lobes lanceolate.

9. SOLANUM FEROX, Linn.; F. B. I. iv. 233; Wt. Ic. t. 1399 (var. *majus*).

W. Ghats, in most Districts, up to 4,000 ft., but not very common.

A stout straggling herbaceous plant up to 10 ft. high with very woolly stems and leaves and large orange hispid fruit. The leaves are often very large.

10. SOLANUM TORVUM, Swartz; F. B. I. iv. 234; Wt. Ic. t. 345.

Almost all Districts, in the hills up to about 3,000 ft., in waste places and by roadsides, common.

A shrub reaching about 12 ft. in height, very variable in shape and lobes of leaf according to climate and soil. Berries yellow, shining.

11. SOLANUM MELONGENA, Linn.; F. B. I. iv. 235; Wt. Ill. t. 166.

All Districts, usually in cultivation. The Egg-plant. Vern. *Hind.* Baigun, brinjal.

A well-known vegetable, the fruits often very large and purple.

Var. *insanum*, Prain. *Solanum insanum*, Willd.

All Districts, in waste places and by roadsides, a wild form.

A very prickly herb with smaller and more grey-pubescent stems and leaves and a globose yellow fruit under 1 in. in diam.

12. SOLANUM INDICUM, Linn.; F. B. I. iv. 234; Wt. Ic. t. 346.

All Districts in the plains and the lower hills, chiefly by roadsides, on rubbish heaps and in similar places.

A branching very prickly undershrub reaching 5 ft. in height, very variable in pubescence, size and shape of leaf and length of raceme. The berries are dark yellow. Vern. *Hind.* Barhanta.

Var. ***multiflora***, C. B. Clarke. *S. ferox* var. *minus*, Wt. Ic. t. 1400.

A large form with very stellate-tomentose leaves and long racemes with many flowers recurved in fruit. The berries are yellow, rather small and shining and long.

W. Ghâts, Nilgiri and Pulney Hills, about 6,000–7,000 ft.

13. SOLANUM SISYMBRIIFOLIUM, Lam.

W. Ghâts, Nilgiris and Pulneys, at 5,000–7,000 ft.; hills of Coimbatore. A S. American plant now run wild in many places in India.

A viscid undershrub, the large flowers often 1–1·5 in. in diam. in lateral racemes.

14. SOLANUM XANTHOCARPUM, Schrad. & Wendl.; F. B. I. iv. 236. *S. Jacquini*. Willd.; Wt. Ic. t. 1401

All Districts in the plains and low hills, a weed of roadsides and waste land.

A diffuse perennial conspicuous herb, the flowers often ·75 in. in diam.

15. SOLANUM TRILOBATUM, Linn.; F. B. I. iv. 236; Wt. Ic. t. 854.

N. Circars, Deccan and Carnatic, especially near the coast.

A very prickly trailing or climbing undershrub.

SOLANUM TUBEROSUM, Linn., is the Potato, Vern. *Hind.* Alu, introduced from America and largely cultivated in the hills. Besides it and *S. Melongena*, the Brinjal, several species of the genus are cultivated in gardens and some are found run wild. *S. robustum*, Wendl., a large species resembling *S. ferox* but with the stems winged by the decurrent leaf-bases, is found about Coonoor in the Nilgiris. It is a S. American species and has

leaves and stems covered with dense golden tomentum. *S. aculeatissimum*, Jacq., is a very prickly Malay species found apparently run wild about Quilon in Travancore. *S. macrophyllum*, Hort. *ex* Dunal, is a Mexican shrub with large handsome purple flowers frequently found in gardens.

2. Physalis. Linn.

Annual or perennial herbs. *Leaves* alternate, entire sinuate or shortly lobed. *Flowers* solitary, axillary, pedicelled. *Calyx* campanulate, 5-fid, in fruit accrescent, then inflated, membranous, loosely enclosing the berry; teeth small, connivent. *Corolla* campanulate, lurid yellow, often with purple spots near the base. *Stamens* 5, attached near the base of the corolla; anthers oblong, shorter than the filaments, dehiscing longitudinally. *Ovary* 2-celled; ovules numerous; style linear; stigma obscurely 2-lobed. *Fruit* a globose berry, enveloped in the bladder-like calyx. *Seeds* many or few, compressed, smooth or rugose; embryo peripheric.

Corolla ·5 in. across or more, with 5 purple spots near the base within; calyx more than 1 in. long, ovoid-conical; leaves ovate, sinuate or angular, usually entire, pubescent, up to 3 in. long, 2 in. broad; berry orange-yellow ..... 1. *peruviana.*

Corolla under ·25 in. across, sometimes spotted; calyx under 1 in. long, ovoid or subglobose; leaves ovate, acute, sinuate or toothed, pubescent or nearly glabrous, up to 2·5 in. long, 1·5 in. broad; berry small, yellow. 2. *minima.*

1. PHYSALIS PERUVIANA, Linn.; F. B. I. iv. 238.
   Hills of the Deccan and Carnatic, Bababudans, Shevaroys, Kollimalais and Sirumalais; W. Ghâts, Nilgiris and Pulneys, usually at 5,000–7,000 ft., in undergrowth of forests, especially plantations; introduced from America and run wild, often cultivated. Cape Gooseberry. Vern. *Hind.* Tipari.
2. PHYSALIS MINIMA, Linn.; F. B. I. iv. 238.
   All Districts, a common weed of undergrowth, roadsides and waste places.
   A herbaceous annual. The glabrous form with angular fruiting calyx is var. *indica*, C. B. Clarke. *P. angulata*, Linn., seems to differ very little from it. It is only a weed of cultivated ground.

3. Withania, Pauq.

Unarmed shrubs, often hoary-tomentose. *Leaves* alternate, entire. *Flowers* axillary, sometimes polygamo-diœcious, fascicled or solitary, sessile or shortly pedicelled. *Calyx* campanulate, 5-6-toothed, accrescent and subglobose in fruit. *Corolla* campanulate; lobes 3-6, short, valvate in bud. *Stamens* 5, attached near the base of the corolla; anthers dehiscing longitudinally. *Ovary* 2-celled, ovules many; style linear; stigma shortly bifid. *Fruit* a globose berry, enclosed in the enlarged calyx. *Seeds* very many, discoid, testa pitted; embryo peripheric.

WITHANIA SOMNIFERA, Dun.; F. B. I. iv. 239; Wt. Ic. t. 853.
Deccan, Ceded Districts Mysore and Coimbatore, in dry localities; occasional in E. Carnatic.
An erect branching undershrub reaching 5 ft. in height, all parts minutely stellate-tomentose. Leaves broadly ovate, up to 4 in. long and little less in breadth; flowers in axillary fascicles. The seeds are sometimes used as rennet. Vern. *Hind.* Asgánd; *Tel.* Pennerugadda; *Tam.* Amkulang.

4. Datura, Linn.

Coarse rank shrubby herbs. *Leaves* large, entire, sinuate or deeply toothed. *Flowers* large, purple or white, solitary, erect or pendulous. *Calyx* long-tubular, herbaceous, 5-lobed, in fruit the upper part deciduous leaving the circumsciss base. *Corolla* long-tubular, funnel-shaped, the mouth wide; limb plaited, entirely or shortly 5- or 10-lobed. *Stamens* 5, attached near the base of the tube; filaments filiform; anthers included, linear, longitudinally dehiscing. *Ovary* 2- or spuriously 4-celled; style filiform; stigma 2-lobed. *Fruit* an ellipsoid spinescent 4-celled capsule, 4-valved or irregularly bursting near the apex. *Seeds* very many, compressed, rugose; embryo peripheric.

Capsule opening irregularly near the apex :—
Capsule covered with short spines or blunt tubercles; flowers white or white with purple outside; leaves ovate, acute, entire or coarsely toothed, with acute lobes, base very unequal-sided, up to 8 in. long, nearly glabrous ..... 1. *fastuosa.*
Capsule covered with long slender spines; flowers white tinged with green; the fruiting calyx very large; leaves ovate-lanceolate, acute,

base very unequal, up to about 4 in. long or more, minutely grey-tomentose ..... *Metel.*
Capsule deeply 4-valved, erect; flowers white: leaves ovate, many-toothed or sinuate, up to about 7 in. long..... *Stramonium.*

DATURA FASTUOSA, Linn.; F. B. I. iv. 242; Wt. Ic. t. 1396.

Almost all Districts, in gardens and on waste land and roadsides, apparently wild.

A large annual somewhat succulent herb with often zigzag stems, soft leaves and subglobose capsules seated on the short persistent saucer-like calyx base. Flowers usually white but purple outside and frequently double. Vern. *Hind.* Dhatura.

Var. *alba*, C. B. Clarke, similar but with the flowers white, not often double, the capsule spines sharper. Same distribution.

D. Metel, Linn.; F. B. I. iv. 243, said to be the most poisonous species, is found about Madras and is at once recognized by the tomentum, the large persistent calyx and the sharp capsule-spines. *D. Stramonium*, Linn.; F. B. I. iv. 242; Wt. Ic. t. 852, is the Thorn Apple, occasionally found in the Hill country. The large shrubby species with beautiful white flowers so commonly found in gardens in the Hills is *D. arborea*, Linn., and the one with orange-scarlet flowers is *D. sanguinea*, Ruiz. & Pav. They were both introduced from S. America.

Lycopersicum esculentum, Mill., is the Tomato, commonly cultivated and occasionally found run wild.

Capsicum annuum, Linn., and *Capsicum frutescens*, Linn., are the plants which are cultivated so extensively as Chillies. They both were originally introduced from S. America and the latter species is now frequently found run wild. For the most usual varieties see Prain, 'Bengal Plants,' p. 747, and Cooke, 'Fl. Bomb.,' ii. 276.

Nicandra physaloides, Gaertn., is a S. American plant, sometimes cultivated but often found run wild or as a weed in gardens in the Hills. It has pretty blue flowers and a dry berry enclosed in the much enlarged heart-shaped calyx-lobes.

Nicotiana Tabacum, Linn., is the Tobacco plant, cultivated in most Districts but especially in Godavari, Kistna, Guntur and Coimbatore. The Family also contains several genera, such as

Browallia, *Brunsfelsia*, *Cestrum* and *Petunia*, affording well-known garden ornamental plants. *Cyphomandra betacea*, Sendt is the Tree Tomato, a S. American shrub cultivated for its fruit, excellent for stewing and tarts.

Family CVII. SCROPHULARIACEAE.

Herbs or shrubs, rarely trees, often semi-parasitic. *Leaves* all or the lower only opposite, rarely all alternate or whorled; stipules 0. *Flowers* hermaphrodite, usually irregular; inflorescence centripetal or composit *Calyx* inferior, usually persistent; lobes 5, rarely 4. *Corolla* hypogynous, more or less 2-lipped or sometimes personate, 4–5-lobed. *Stamens* usually 4, didynamous or subequal, with or without a staminode, rarely 5 or only 2; anthers various, 1- or 2-celled, the cells distinct or more or less confluent, sometimes imperfect. *Disk* annular cupular or glandular. *Ovary* 2-celled; ovules many, rarely few, in each cell; style simple; stigma capitate dilated, 2-lobed or 2-lamellate. *Fruit* a capsule, rarely a berry; placentas on a free central axis or attached to the margins of the valves. *Seeds* small, various in shape; albumen fleshy, rarely 0; embryo straight or curved.

Leaves all alternate; corolla subrotate, the tube short; large erect herbs :—

Stamens 5. ..... 1. **Verbascum.**

Stamens 4. ..... 2. **Celsia.**

Leaves, at least the lower, if not all, opposite; corolla-tube usually elongate :—

Corolla spurred in front at the base; capsule opening by pores 3. **Linaria.**

Corolla not spurred in front at the base; capsule opening by valves :—

Corolla-lobes subequal; anthers 1-celled; capsule septicidal 4. **Sutera.**

Corolla distinctly bilabiate :—

Stamens 4, included within the corolla-tube :—

Corolla-throat 2-lobed on the palate; anther-cells divaricate :—

Calyx 5-angled and 5-toothed; anther-cells confluent at the apex; leaves all opposite ..... 5. **Mimulus.**

Calyx widely campanulate with 5 leafy lobes; anther-cells distinct; lower leaves opposite, upper alternate 6. **Mazus.**

Corolla-throat not lobed on the palate; anther-cells distinct :—

Calyx widely campanulate; corolla-palate with two folds; anther-cells stipitate; capsule loculicidal... 7. **Lindenbergia.**

Calyx 5-partite corolla-palate without folds; capsule both loculicidal and septicidal :—

Anther-cells stipitate :—

Stamens 4, 2 or all with one anther-cell imperfect; uppermost lobe of calyx much the largest. 8. **Adenosma.**

Stamens with all cells perfect :—

Placentas separating in fruit or if joined in a column not winged; seeds terete ..... 9. **Stemodia.**

Placentas joined in a column winged by the remains of the septa; seeds angular ..... 10. **Limnophila.**

Anther-cells contiguous, not stipitate; three lobes of the calyx larger than the other two, which are very narrow 11. **Moniera.**

Stamens 2 perfect, the anterior pair reduced to staminodes, all inserted in the corolla-tube ..... 12. **Dopatrium.**

Stamens, if 4 the anterior (lower) pair, if 2 the staminodes, attached to the corolla-throat, the posterior or only perfect pair inserted within the corolla-tube; capsule septicidal :—

Stamens 4, all perfect :—

Calyx-lobes broad; stout erect herbs ..... 13. **Artanema.**

Calyx-lobes narrow; slender herbs, erect or trailing :—

Calyx winged or keeled, mouth oblique ..... 14. **Torenia.**

Calyx-lobes equal, not winged or keeled ... 15. **Vandellia.**

Two upper stamens only perfect, the lower pair reduced to staminodes ..... 16. **Ilysanthes.**

Corolla small, almost or quite uniform with subequal lobes; lower stamens perfect, upper 0 or reduced to staminodes :—

Calyx tubular, 5-lobed; leaves opposite :—

Anther-cells confluent; leaves narrow ..... 17. **Microcarpaea.**

Anthers 1-celled; leaves broad, fleshy ..... 18. **Peplidium.**

Calyx campanulate, 3–4-lobed; anther cells confluent at the tips; minute herbs with fascicled leaves ..... 19. **Glossostigma.**

Corolla-lobes flat, spreading :—

Corolla-lobes subequal, the throat bearded; stamens 4; capsule globose, septicidal ..... 20. **Scoparia.**

Corolla-lobes subequal, the 2 lateral the wider; stamens 2; capsule compressed, usually loculicidal ..... 21. **Veronica.**

Corolla-tube elongate, the lobes spreading; stamens 4, didynamous,

the anther-cells distinct, equal or one imperfect or wanting; semi-parasitic herbs:—

Calyx tubular, ribbed, 5-lobed:—

Corolla-tube straight or nearly so, the lobes subequal ..... 22. **Buchnera.**

Corolla-tube abruptly incurved near the middle, the 2 upper lobes the smaller ..... 23. **Striga.**

Corolla-tube broad; calyx campanulate, oblique; anthers 2-celled ..... 24. **Alectra.**

Corolla-tube straight or curved; anthers 1-celled ..... 25. **Rhamphicarpa.**

Corolla-tube straight; anthers 2-celled:—

Anthers with one cell imperfect ..... 26. **Sopubia.**

Anthers 2-celled, the cells subequal, both perfect ..... 27. **Micrargeria.**

Calyx spathaceous, split down the front:—

Corolla-lobes subequal, broad, spreading; anthers 2-celled, one cell often imperfect ..... 28. **Centranthera.**

Corolla strongly 2-lipped, the upper lip erect, hooded; anther-cells both perfect ..... 29. **Pedicularis.**

1. **Verbascum**, Linn.

Erect, tomentose or woolly, usually tall and biennial or perennial herbs. *Leaves* alternate, entire, sinuate or pinnatifid. *Flowers* usually yellow, rarely purple red or white, in simple or panicled terminal bracteate racemes or spikes. *Calyx* 5-lobed, usually deeply, the lobes imbricate. *Corolla* rotate; lobes 5, the two posterior ones outside in bud. *Stamens* 5; filaments all or the 3 upper bearded; anthers transverse or oblique, the cells confluent. *Ovary* rounded; style dilated towards the stigmatose apex. *Fruit* a globose oblong or ovoid septicidal capsule, the valves separating from the axis. *Seeds* many, rugose; embryo straight.

Viscid pubescent herbs; leaves oblong-lanceolate or oblanceolate, the upper coarsely dentate, cordate and amplexicaul at base, the lower almost pinnatifid and auricled; flowers bright yellow, purple at base, the filaments with purple woolly hairs ..... 1. *virgatum.*

Stellately grey-tomentose herbs; leaves lanceolate-acuminate, decurrent along the stem at base, entire or slightly crenate; flowers yellow in a densely woolly spike; 3 of the filaments with white hairs, 2 longer glabrous ..... 2. *Thapsus.*

1. VERBASCUM VIRGATUM, With.; F. B. I. iv. 250; Wt. Ic. t. 1404–5.

   W. Ghâts, Nilgiris and Pulneys, at high levels, introduced from Europe and run wild.

   A tall erect herb, reaching sometimes 6 ft. in height.

2. VERBASCUM THAPSUS, Linn.; F. B. I. iv. 250.

   W. Ghâts, Nilgiri Hills, about Ootacamund, introduced from Europe or N. India and now rapidly spreading (Bourne).

   A tall handsome and conspicuous woolly herb, reaching to about 3 ft. in height.

2. Celsia, Linn.

Annual or biennial erect herbs. *Leaves* alternate, crenate sinuate dentate or pinnatifid. *Flowers* in terminal bracteate spikes or racemes, rarely branched. *Calyx* deeply 5 lobed. *Corolla* rotate, tube almost none; lobes 5, broad, somewhat unequal, the upper outermost in bud. *Stamens* 4, didynamous or subequal; filaments bearded; anthers transverse or oblique, with confluent tips. *Ovary* ovoid or globose, ovules many; style entire; stigma compressed, terminal. *Fruit* a globose or ovoid septicidal capsule; valves 2, each usually bifid. *Seeds* many, very small, transversely rugose.

CELSIA COROMANDELIANA, Vahl; F. B. I. iv. 251; Wt. Ic. t. 1406.

All plains Districts, chiefly as a weed on cultivated lands.

An erect, grey-pubescent annual with yellow flowers in a branching racemose inflorescence, the leaves lyrate-pinnatifid at base, gradually smaller up the stem.

3. Linaria, Juss.

Herbs. *Leaves* usually opposite or whorled below, alternate above. *Flowers* axillary, solitary or passing into terminal racemes or spikes with the floral leaves reduced to bracts; pedicels slender. *Calyx* 5-partite; lobes imbricate. *Corolla* 2-lipped and personate, the upper lip erect, 2-lobed, the lower spreading, 3-lobed, spurred at the base. *Stamens* 4, didynamous, ascending; anthers with distinct parallel cells. *Ovary* ovoid or globose, many-ovuled; style filiform; stigma minute. *Fruit* an

ovoid or globose 2-celled capsule, each cell or the anterior only opening by an apical pore. *Seeds* many, angled rugose and wingless or discoid and winged.

LINARIA RAMOSISSIMA, Wall. Pl. As. Rar. t. 153; F. B. I. iv. 251; Wt. Ill. t. 165.

Deccan, Bellary District; Bababudan Hills of Mysore; E. slopes of Anamalais, on walls and rocks and in stony places.

A glabrous or slightly pubescent perennial prostrate herb with very slender branches, variable but usually triangular-hastate lobed leaves and small yellow flowers.

4. Sutera, Roth.

Herbs or small shrubs, often viscid. *Leaves* opposite or the upper alternate, subentire pinnatifid or toothed. *Flowers* axillary or in simple terminal racemes; bracts small, leafy. *Calyx* deeply 5-lobed, lobes narrow. *Corolla* tubular: tube slender, cylindric, straight or curved; lobes 5, the two upper outside in bud and rather smaller than the 3 lower. *Stamens* 4, didynamous, included; anthers confluent, 1-celled. *Ovary* with many ovules in each cell; style filiform; stigma slightly 2-lobed *Fruit* an ovoid-oblong septicidal capsule, the valves bifid. *Seeds* many, minute, rugose.

SUTERA GLANDULOSA, Roth; F. B. I. iv. 258; Wt. Ic. t. 856.

N. Circars, Deccan and Carnatic, west to Coimbatore, south to near Madras, not common.

An annual erect branching herb with much cut pinnatifid leaves, and very small nearly white flowers.

5. Mimulus, Linn.

Erect prostrate or creeping herbs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* tubular, 5-angled, lobes 5, short. *Corolla* 2-lipped: upper lip 2-lobed, erect or reflexed: lower 3-lobed, spreading, the throat with usually a swollen 2-lobed palate. *Stamens* 4, didynamous; anther-cells divergent, sub-confluent. *Ovary* ovoid; style slender; stigma 2-lamellate. *Fruit* a compressed loculicidal capsule, the valves separating from the placentiferous dissepiment. *Seeds* many, minute, oblong.

MIMULUS ORBICULARIS, Benth.; F. B. I. iv. 259.

N. Circars, Chilka Lake, Ganjam (D. Hooper).

A prostrate creeping and rooting herb with fleshy orbicular nerveless leaves about 1 in. in diam. on thick petioles, the long-pedunculate flowers with campanulate calyx and corollas about ·4 in. long apparently pale blue, the seeds minutely puncticulate in lines.

6. Mazus, Lour.

Small herbs, often with runners. *Leaves* opposite or rosulate below, above opposite or alternate. *Flowers* in terminal subsecund racemes; bracts minute, bracteoles 0. *Calyx* campanulate, 5-lobed, the lobes leafy. *Corolla* 2-lipped, the tube short; upper lip 2-lobed, erect; lower much larger, spreading, 3-lobed; throat with a two-lobed palate. *Stamens* 4, didynamous; anther-cells divaricate. *Ovary* with many ovules; style short; stigma 2-lamellate. *Fruit* a small globose or compressed loculicidal capsule, the 2 valves entire. *Seeds* many, very minute, rugose.

MAZUS RUGOSUS, Lour.; F. B. I. iv. 259.

N. Circars, in Ganjam (Barber); W. Ghâts, in Coorg (Bourne) and Nilgiris (Lawson, Fischer) up to 7,000 ft.

A small herb without runners, the radical leaves in rosette, obovate-spathulate, crenate, the scapes usually leafless, the flowers pale blue or white streaked with blue, the leafy calyx-lobes conspicuous.

7. Lindenbergia, Lehm.

Annual or perennial herbs; branches erect or straggling. *Leaves* opposite or the upper alternate toothed. *Flowers* usually yellow, axillary or passing into terminal spikes or racemes; bracts leafy, bracteoles 0. *Calyx* widely campanulate, 5-lobed. *Corolla* 2-lipped; tube cylindric; upper lip outermost, short, 2-lobed; lower larger, 3-lobed, the palate with 2 folds. *Stamens* 4, didynamous, included; anthers with separate stalked cells. *Ovary* with many ovules; style filiform, clavate upwards; stigma capitate. *Fruit* a loculicidal capsule, the 2 valves separating from the placentiferous dissepiment. *Seeds* very many, minute.

Perennial herb; leaves rather thick, ovate, cuneate at base, coarsely serrate except at base, up to 2·5 in. long, 1·5 in. broad, or sometimes

larger; softly pubescent; flowers large, the corolla about 1 in. long; calyx campanulate, ·3 in. long; capsule acute at tip and exsert
1. *grandiflora.*

Annual slender herb; leaves thin, ovate, cuneate at base, coarsely serrate except at base, up to 1·5 in. long, ·75 in. broad, sometimes more, pubescent or glabrous; flowers small, the corolla about ·5 in. long; calyx campanulate, ·15 in. long; capsule acute, scarcely exsert
2. *urticaefolia.*

1. LINDENBERGIA GRANDIFLORA, Benth.; F. B. I. iv. 261; Bot. Mag. t. 7738.
   N. Circars, Mahendragiri Hill in Ganjam, at 4,000 ft. (Gamble, Fischer), on banks in shady woods.
   A slender glandular hairy fairly stout plant with bright yellow flowers.
2. LINDENBERGIA URTICAEFOLIA, Link and Otto; F. B. I. iv. 262.
   Shevaroy Hills of Salem (Wight), on walls and banks.
   A very slender glandular rather flaccid herb with yellow flowers.

8. Adenosma, R. Br.

Annual, villous or glandular, aromatic herbs. *Leaves* opposite or whorled, serrate or crenate, rugose. *Flowers* axillary or in leafy spikes racemes or heads; bracteoles conspicuous or 0. *Calyx* deeply lobed, the uppermost lobe the largest, sometimes all enlarging in fruit. *Corolla* 2-lipped, the tube cylindric; upper lip erect, entire or notched, outermost in bud; lower spreading, 3-lobed. *Stamens* 4, didynamous; anther-cells separate, stipitate, one cell of each anterior stamen or of all stamens imperfect. *Ovary* with many ovules; style filiform below, dilated at the tip, winged upwards under the entire or 2-lamellate stigma. *Fruit* an ovoid ellipsoid or lanceolate capsule, both loculicidally and septicidally 4-valved. *Seeds* many, minute, scabrous-punctate, reticulate or pitted.

Flowers axillary; 3 outer sepals in fruit ovate lanceolate, reticulate, ciliate on the margins and midrib, 2 inner linear lanceolate, narrow; leaves broadly ovate, crenate, up to 1 in. long, ·75 in. broad, petiole ·3 in.; seeds pitted in lines ..... 1. *subrepens.*

Flowers axillary below, uppermost in leafy heads; 3 outer sepals in fruit lanceolate, one rather larger, hirsute, 2 inner subulate-lanceolate;

leaves ovate to ovate-oblong, crenulate, up to 1·25 in. long, ·6 in. broad, petiole ·1 in.; seeds minutely dotted in lines .....2. *malabaricum.*
Flowers in dense terminal heads at the ends of opposite or whorled peduncles; all the sepals lanceolate, one slightly larger, ciliate: leaves ovate to ovate-oblong, coarsely crenate, up to 2 in. long, 1 in. broad, petiole 0–·2 in.; seeds scabrous .....3. *capitatum.*

1. ADENOSMA SUBREPENS, Hook. f.; F. B. I. iv. 263.
   Travancore, at Valur, 1,000 ft. (Meebold); Malabar (Wight).
   A trailing herb, rooting at the nodes, the flowers bluish-purple.
2. ADENOSMA MALABARICUM, Hook. f.; F. B. I. iv. 264.
   W. Coast, in Malabar (Wight).
   An erect herb, up to about 1 ft. high.
3. ADENOSMA CAPITATUM, Hook. f.; F. B. I. iv. 264.
   W. Coast and W. Ghâts, S. Canara to Travancore, in rice fields.
   An erect herb, up to 2 ft. high, with blue flowers.

9. Stemodia, Linn.

Herbs, sometimes woody below, glandular-pubescent, often aromatic. *Leaves* opposite or sometimes whorled, serrate. *Flowers* axillary, solitary, passing into terminal leafy spikes or close racemes; bracts leafy; bracteoles 1 or 2, small. *Calyx* deeply 5-lobed; lobes narrow, equal, or the upper a little larger. *Corolla* 2-lipped; tube cylindric, often villous within; upper lip 2-lobed, erect, entire or notched; lower 3-lobed, spreading. *Stamens* 4, didynamous, included; filaments filiform; anther-cells distinct, stalked, all perfect. *Ovary* with many ovules; style filiform; stigma 2-lobed. *Fruit* a globose or ovoid capsule; valves 2, septicidal, bifid, or valves 4, dehiscing both septicidally and loculicidally; placentas not winged. *Seeds* numerous, very minute, terete.

STEMODIA VISCOSA, Roxb.; F. B. I. iv. 265; Wt. Ic. t. 1408.
Most plains Districts, in wet ground and rice fields.
A many-branched aromatic viscid-pubescent herb with sessile more or less oblong usually cordate and amplexicaul leaves and violet corolla.

10. Limnophila, R. Br.

Marsh or water plants, glabrous or pubescent, aromatic. *Leaves* with transparent dots, opposite or whorled, toothed or

incised, or, if submerged, with capillaceo-multifid lobes. *Flowers* axillary, sessile or pedicelled, solitary or passing into terminal spikes or racemes; bracts leafy, bracteoles small or 0. *Calyx* 5-partite, the lobes subequal or the posterior larger. *Corolla* 2-lipped; tube cylindric; upper lip outermost, suberect, entire or 2-lobed; lower spreading, 3-lobed. *Stamens* 4, didynamous, included; anther-cells separate, stalked. *Ovary* with many ovules; style slender, deflexed at tip; stigma 2-lamellate. *Fruit* an ovoid or globose capsule, often acute, dehiscing both loculicidally and septicidally, the placentiferous dissepiment separating with the valves and usually winged with the remains of the septa. *Seeds* many, minute, angular, truncate.

Leaves pinnately nerved, not ribbed; no whorls of pinnatifid or multifid lower leaves; calyx usually striate :—

Flowers sessile in close axillary heads; leaves opposite, elliptic or ovate, up 3·5 in. long, petioled; calyx in fruit not striate but with a strong midrib to the acuminate lobes; capsule oblong, compressed
1. *Roxburghii.*

Flowers axillary, solitary or in spikes or racemes :—

Leaves all opposite, subsessile, elliptic-ovate or -obovate, crenate-serrate, the serratures often crustaceously thickened, punctate, up to 1 in. long, ·5 in. broad; flowers axillary, solitary or in spikes or racemes; calyx lobes lanceolate, acuminate, hirsute..2. *conferta.*

Leaves opposite or 3–4-nately whorled; flowers pedicelled; calyx-lobes lanceolate-acuminate :—

Leaves sessile, semi-amplexicaul at base, linear-oblong or lanceolate, serrulate, up to 2·5 in. long, ·5 in. broad; flowers in axillary or terminal many-flowered racemes, rarely solitary; calyx-lobes glabrate .....3. *gratissima.*

Leaves sessile or very shortly petioled, elliptic-oblong or -obovate, serrulate, up to 1·5 in. long, ·5 in. broad; flowers usually solitary, sometimes in short axillary racemes; calyx-lobes hirsute.....4. *hirsuta.*

Leaves 3–5-ribbed from the base; lower leaves usually pinnatifid or multifid; calyx not striate :—

Flowers sessile or nearly so :—

Flowers solitary, axillary :—

Leaves all opposite, none pinnatifid or multifid, ovate-oblong or elliptic, semi-amplexicaul, crenate-serrate, up to 1 in. or rather more in length and ·5 in. broad; calyx-lobes ovate, acuminate
5. *hypericifolia.*

Upper leaves opposite, middle ones whorled, pinnatifid, lowest capillaceo-multifid; calyx-lobes glabrous, ovate, abruptly acuminate ..... 6. ***heterophylla.***

Flowers in terminal or axillary often divaricately branched spikes, the upper leaves opposite or whorled, linear-oblong, crenulate, up to about 1·5 in. long, the lower capillaceo-multifid; calyx-lobes ovate, acuminate ..... 7. ***polystachya.***

Flowers pedicelled, the lowest leaves always capillaceo-multifid:—

Stem 1–2 ft. high; corolla over ·5 in. long; upper leaves conspicuous, oblong-lanceolate, serrate, sessile and semi-amplexicaul, up to 2 in. long, ·5 in. broad, middle ones whorled, laciniate; calyx-lobes ovate abruptly acuminate, at first glandular, in fruit glabrous 8. ***racemosa.***

Stem 3–8 in. high; corolla under ·3 in. long; upper leaves frequently none, sometimes linear-oblong, up to ·75 in. long, ·2 in. broad, middle ones whorled, laciniate; calyx-lobes ovate, acuminate, pubescent ..... 9. ***gratioloides.***

1. LIMNOPHILA ROXBURGHII, G. Don; F. B. I. iv. 265.

   N. Circars, Rampa Hills of Godavari, at 3,000 ft. (V. Narayanswami), in wet places in shade.

   An aromatic annual herb, creeping and rooting at the base, the flowers blue-purple with a yellow mouth.

2. LIMNOPHILA CONFERTA, Benth.; F. B. I. iv. 266.

   W. Coast Districts, in wet places, rice fields, etc., to 2,000 ft. in the W. Ghâts.

   A very variable erect or prostrate or floating plant, rooting at the nodes, the flowers violet-pink.

3. LIMNOPHILA GRATISSIMA, Bl.; F. B. I. iv. 268.

   W. Coast Districts, in wet places, margins of ponds and backwaters; W. Ghâts, Anamalais at 2,000 ft. (Fischer).

   A tall glabrous plant, decumbent at base and rooting at the lower nodes, then erect; flowers purple, usually in terminal panicles of racemes with small bracts.

4. LIMNOPHILA HIRSUTA, Benth.; F. B. I. iv. 268.

   W. Coast Districts and lower hills of W. Ghâts, in wet places.

   A tall hirsute plant, reaching 18 in. in height, usually very hirsute, but occasionally (var. *glabra*, C. B. Clarke MS. from the E. Ghâts) nearly glabrous and with always opposite leaves.

5. LIMNOPHILA HYPERICIFOLIA, Benth.; F. B. I. iv. 269; Wt. Ic. t. 1409.

W. Ghâts. Nilgiris, Pulneys and hills of Travancore, at 3,000–7,000 ft., in bogs and other wet places.

A tall glabrous herb, reaching 2 ft. in height with rose-purple flowers.

6. LIMNOPHILA HETEROPHYLLA, Benth.; F. B I. iv. 270.

S. Canara. Mysore and Tinnevelly, apparently scarce, in rice fields and wet places.

A rather tall erect herb, with leaves of all three forms, the stems often from the nodes of a long under-water horizontal stem with many capillary leaves.

7. LIMNOPHILA POLYSTACHYA, Benth.; F. B. I. iv. 269; Wt. Ic. t. 860.

Carnatic, in Tanjore (Wight) and other places, in rice fields and wet places, but scarce.

A water plant, with the upper parts erect and recognized by the racemes of small white flowers in terminal panicles.

8. LIMNOPHILA RACEMOSA, Benth.; F. B. I. iv. 271; Wt. Ic. t. 861. *Cyrilla aquatica*, Roxb. Cor. Pl. t. 189.

N. Circars, Deccan and W. Coast, in rice fields and flooded land, common.

A water plant, often rising to 1 or 2 ft. above the surface, the flowers pale violet with reddish blotches on the lip, usually in long bracteate racemes.

9. LIMNOPHILA GRATIOLOIDES, R. Br.; F. B. I. iv. 271.

All plains Districts, in pools, swamps and rice fields.

A small much branched plant, glabrous or pubescent, smelling of turpentine, very variable, chiefly according to the amount of wetness of the locality, in mud or shallow water short and leafy, in deeper water elongate and with the capillaceo-multifid leaves developed (var. *elongata*, Benth.). Flowers white with a pink ring at the mouth of the corolla.

11. Monniera, B. Juss.

Glabrous herbs. *Leaves* often punctate, entire or toothed or multifid when submerged. *Flowers* axillary, solitary or racemose, yellow blue or white; bracteoles small or 0. *Calyx* 5-partite; lobes imbricate, the upper largest, the 2 innermost often

very narrow. *Corolla* 2-lipped, tube cylindric; upper lip outside in bud, emarginate or 2-lobed, lower 3-lobed. *Stamens* didynamous, included; anther-cells contiguous, distinct. *Ovary* with many ovules in each cell; style dilated at top; stigma entire or 2-lobed. *Capsule* globose or ovoid, 2-grooved, valves 2 or 4 separating from the entire placentiferous dissepiment. *Seeds* many, minute, often striate.

Creeping herb, rooting at the nodes, the numerous branches ascending; leaves obovate-oblong, about ·5 in. long, obtuse; flowers solitary, pedicelled, capsule ovoid ..... 1. *cuneifolia*.

Erect herbs, the stems often branched: leaves linear-lanceolate, up to 1·25 in. long, acute; capsule globose:—

Flowers solitary in the leaf axils, sessile; placentas separating, winged 2. *Hamiltoniana*.

Flowers 1–3 together in the axils, pedicelled; placentas combined, not winged ..... 3. *floribunda*.

1. MONIERA CUNEIFOLIA, Michx. *Herpestis Monnieria*, H. B. & K.; F. B. I. iv. 272. *Gratiola Monniera*, Linn.; Roxb. Cor. Pl. t. 178.

   All plains Districts, and in the hills to about 4,000 ft., in wet places, even in saltish water.

   A somewhat succulent creeping herb with blue flowers.

2. MONIERA HAMILTONIANA, T. Cooke *Herpestis Hamiltoniana*, Benth.; F. B. I. iv. 272

   W. Coast, S. Canara to Cochin, in wet places.

   An erect rather thick herb, the stems terete, the flowers pink.

3. MONIERA FLORIBUNDA, T. Cooke. *Herpestis floribunda*, R. Br.; F. B. I. iv. 273.

   Carnatic, in Nellore and Chingleput; S. Canara (Hohenacker).

   An erect slender herb with subquadrangular stems and white corolla having purplish stripes on the upper lip (Fischer).

12. Dopatrium, Buch.-Ham.

Annual slender glabrous marsh herbs. *Leaves* few, opposite, the lower pairs small, the upper minute, remote. *Flowers* small, solitary, axillary, violet; bracteoles 0. *Calyx* small, 5-partite, lobes narrow, imbricate *Corolla* 2-lipped; tube slender, dilated

to a broad throat; upper lip outside in bud, 2-lipped; lower 3-lobed, spreading. *Stamens* 2 upper perfect; filaments filiform; anthers with parallel distinct equal cells; lower pair reduced to minute staminodes. *Ovary* with many ovules; style short; stigma 2-lamellate. *Fruit* a small globose or oblong capsule, opening loculicidally, the valves placentiferous. *Seeds* many, very small, reticulately pitted or tuberculate.

Capsule linear-oblong, the fruiting pedicel deflexed; stem usually branched from the base, the many slender branches erect, up to about 6 in. high, the radical leaves few, subrosulate, obovate, at most ·5 in. long, the cauline minute, linear; corolla ·3 in. long.....1. *nudicaule.*

Capsule globose :—

Fruiting pedicels 0 or under ·5 in. and capillary, erect; stems much branched from the base with fleshy erect branches up to 12 in. high, the radical leaves elliptic oblong or obovate, up to 1 in. long, the cauline small, larger below but gradually smaller upwards; corolla very small, ·2 in. long .....2. *junceum.*

Fruiting pedicels capillary, up to 1 in. long, horizontally spreading; stems erect, usually single or at most 2–3 from the base, fleshy, up to 18 in. high, lower leaves obovate-oblong or spathulate, up to 2 in. long, ·5 in broad, cauline very small and distant; corolla ·5 in. long 3. *lobelioides.*

1. DOPATRIUM NUDICAULE, Buch.-Ham.; F. B. I. iv. 274.
   Carnatic, Nellore to Tinnevelly, on damp ground near the coast.
   A slender erect herb.
2. DOPATRIUM JUNCEUM, Buch.-Ham.; F. B. I. iv. 274.
   All plains Districts and up to 4,000 ft. in the hills, in wet places, ponds and rice fields.
   An erect very slender fleshy herb with pink flowers.
3. DOPATRIUM LOBELIOIDES, Benth.; F. B. I. iv. 274; Wt. Ic. t. 859.
   Carnatic, near Madras, in tanks and wet places.
   A rather tall slender fleshy herb with comparatively large flowers.

13. Artanema, D. Don.

Erect herbs, the stems tetragonal, scabrid on the angles. *Leaves* opposite, entire or serrate. *Flowers* large, blue or purple, in terminal bracteate but ebracteolate racemes, the bracts foliaceous. *Calyx* 5-partite, the lobes broad, imbricate, acuminate.

Corolla 2-lipped; tube broad; upper lip erect, broad, emarginate, lower 3-lobed, spreading. *Stamens* 4, didynamous, perfect, the 2 upper with short filaments included in the tube, the 2 lower with long arched filaments broadly appendiculate at the base, arching to become connivent under the upper lip; anther-cells connivent at their tips. *Ovary* many-ovuled; style slender; stigma 2-lamellate. *Fruit* a globose capsule, dehiscing septicidally, the valves separating from the broadly-winged placentiferous axis. *Seeds* many, small, truncate, papillose.

ARTANEMA SESAMOIDES, Benth.; F. B. I. iv. 274; Wt. Ic. t. 1410.

W. Coast, in Malabar and Travancore, rising to about 3,000 ft. in the Wynaad and Coorg.

A stout erect herb or undershrub, 2–3 ft. high, with large violet-purple flowers and lanceolate-acuminate usually serrate leaves up to 4 in. long.

14. Torenia, Linn.

Herbs, glabrous or pubescent, usually trailing and rooting. *Leaves* opposite, entire crenate or serrate. *Flowers* axillary or in terminal or pseudo-axillary umbels or racemes; bracteoles 0. *Calyx* usually 2-lipped, oblique at the mouth, 3–5-lobed, the back of the lobes or of some of them winged or keeled. *Corolla* 2-lipped; tube cylindric, somewhat curved, dilated upwards; the upper outer lip erect, concave, notched or 2-fid, the lower larger, 3-lobed, spreading. *Stamens* 4, didynamous, the 2 upper included, the two lower arched to meet under the upper lip, often with appendages about the middle; anthers connate in pairs. *Ovary* with many ovules; style slender; stigma 2-lamellate. *Fruit* a linear or oblong septicidal capsule, the valves separating from the placentiferous dissepiment which is often winged. *Seeds* many, rugose or cancellate.

Calyx, especially in fruit, rather broadly winged :—

Calyx and corolla both small, together under ·7 in. long :—

Calyx broadly ovoid with ciliate wings; pedicels slender, ·5–1 in. long; lower filaments without appendages; leaves ovate, acute, sharply serrate, cuneate or sub-cordate at base, up to 1·25 in. long, petiole ·25–·5 in. long ..... 1. *cordifolia*.

Calyx narrowly oblong with ciliate wings; pedicels slender, 1–2 in.

long: lower filaments with clavate appendages; leaves triangular-ovate, acute, crenate-serrate, obtuse at base, up to 1·5 in. long, petiole ·1–·2 in. long ..... 2. *courtallensis.*

Calyx and corolla both long, the calyx narrowly oblong, especially in fruit, not ciliate, ·7–1 in. long, the lobes acuminate, decurrent at base; corolla up to 1·25 in. long; lower filaments with subulate appendages; pedicels up to nearly 2 in. long, thick and usually deflexed in fruit; leaves ovate-lanceolate, acuminate, obtuse at base, serrate, up to 2 in. long, petiole ·1–·5 in. long ..... 3. *travancorica.*

Calyx, especially in fruit, narrowly winged, the wings often only keeled not decurrent, hirsute, ciliate; corolla small, up to ·75 in. long; lower filaments with short rounded appendages; pedicels 1–1·5 in. long, thickened and deflexed in fruit; leaves ovate to ovate-oblong, sub-obtuse, truncate or subcordate at base, distantly serrate, up to 1·5 in. long, petiole ·1–·2 in. long ..... 4. *vagans.*

Calyx not winged:—

Calyx in fruit glabrous, narrowly oblong, ·5–·75 in. long, strongly keeled, the keels decurrent on the stout pedicel; corolla 1–1·25 in long; appendages of lower filaments shortly subulate; leaves deltoid-ovate, crenate, subcordate, sparsely hirsute, ·75 in. long, petiole up to ·5 in. long ..... 5. *bicolor.*

Calyx in fruit not strongly keeled, hirsute:—

Calyx ·75 in. long, reticulate in fruit; pedicels 1·5 in. long; corolla up to 1·5 in. long, broad at mouth; appendages subulate; leaves deltoid-ovate, acute, truncate or cordate at base, coarsely serrate, up to 2 in. long, 1 in. broad, but usually smaller, very pubescent, petiole ·3–·5 in. long ..... 6. *hirsuta.*

Calyx ·4 in. long, hirsute, cleft nearly to the base, the lobes lanceolate; pedicels 2–4 at the node, spreading, ·3–·4 in. long; corolla short; appendages minute; leaves ovate or ovate-lanceolate, acute, serrate, up to 1 in. long, petiole under ·25 in. long ..... 7. *parviflora.*

1. TORENIA CORDIFOLIA, Roxb. Cor. Pl. t. 161; F. B. I. iv. 276.

N. Circars, on Mahendragiri Hill, Ganjam (Fischer); W. Ghâts, Carcoor Ghât in Malabar (Beddome).

A low erect trichotomously branching herb up to 10 in. high, the stems and branches tetragonous; corolla small, pale bluish purple.

2. TORENIA COURTALLENSIS, Gamble in Kew Bull. 1923, ined. *T. cordifolia*, Roxb.; F. B. I. iv. 276 *in note by* Sir J. D. Hooker.

W. Ghâts, Anamalais and hills of Madura, Tinnevelly and Travancore, at about 4,000 ft.

A trailing herb with long decumbent stems and long pedicels; flowers lilac, the lower lip mottled with purple (Blatter and Hallberg).

3. TORENIA TRAVANCORICA, Gamble n. comb. *T. asiatica*, Hook. f.; F. B. I. iv. 277 *in part*; Wt. Ic. t. 862; Bot. Mag. t. 4249.

W. Ghâts, hills of Travancore and Tinnevelly.

A creeping annual herb with large flowers, white with blue blotches on the lobes of the lower lip.

4. TORENIA VAGANS, Roxb.: F. B. I. iv. 277. *T. hirtella*, Hook. f.; F. B. I. iv. 277 *in part.*

W. Ghâts, Nilgiris, especially on the E. side, at 5,000–6,000 ft. (Clarke, Gamble).

A diffuse trailing and rooting herb with pale blue corolla having darker blotches on the lobes of the lower lip.

5. TORENIA BICOLOR, Dalz.; F. B. I. iv. 278.

W. Ghâts and W. coast from S. Canara to Travancore, up to 2,000 ft.

A small trailing and rooting herb with small leaves and the corolla with dark blue or violet upper and white lower lip. It might be the "Kaka-pu" of Rheede Hort. Mal. ix. t. 53.

6. TORENIA HIRSUTA, Benth.; Bot. Mag. t. 5167. *T. asiatica* var. *hirsuta*, Hook. f.; F. B. I. iv. 277.

W. Ghâts, in most Districts, but especially W. Nilgiris, at 3,000–6,000 ft.

A rather stout hirsute diffuse herb with handsome flowers, white on the mid-lobe of the lower lip, deep blue on the side lobes, pale blue on the upper lip.

7. TORENIA PARVIFLORA, Ham.; F. B. I. iv. 278.

N. Circars, Bison Hills, Godavari (Barber).

A small decumbent annual up to 8 in. in height, with blue pedicellate flowers clustered in the upper axils.

Torenia Fournieri, Linden. is an introduction from Cochin China, which is frequently grown in gardens for its showy flowers of a pale blue with bright purple blotches on the lobes of the lower lip and yellow in the throat and tube (Bot. Mag. t. 747).

15. Vandellia, Linn.

Herbs, usually annual, glabrous or pubescent. *Leaves* opposite, often toothed. *Flowers* small, axillary or racemose; bracteoles 0. *Calyx* campanulate, not winged, cleft in 5 lobes, sometimes to the base. *Corolla* 2-lipped; tube cylindric; upper lip outer, erect, notched or bifid, lower 3-lobed spreading. *Stamens* 4, didynamous, the 2 upper on the corolla throat, usually included, the 2 lower with arched filaments having a subulate or rounded appendage towards the base; anthers cohering in pairs, the cells divaricate. *Ovary* with many ovules; style slender; stigma 2-lamellate. *Fruit* a globose ovoid or linear septicidal capsule, the valves separating from the placentiferous septum, which is usually more or less winged. *Seeds* many, rugose.

Leaves pinnately nerved :—

Capsule about equalling the calyx; placentiferous dissepiment broadly winged :—

Calyx not divided below the middle, lobes acute, glabrous except the prominent rib; flowers pedicelled, axillary or subracemose at the ends of the branches; filaments of lower stamens with subulate appendages; leaves suborbicular ovate or lanceolate, shortly serrate, up to ·75 in. long; petiole about ·1–·3 in. long . . 1. *crustacea*.

Calyx divided to the base or near it, the lobes strigosely white hispid; filaments of lower stamens with rounded appendages :—

Erect herb with the flowers in lax axillary and terminal racemes; leaves at the main nodes large, ovate or elliptic, obtuse, serrate, membranous, up to 2 in. long, 1 in. broad, petioled, those on branch nodes smaller and sometimes sessile . . . . . 2. *hirsuta*.

Diffuse herb, many-branched, with axillary flowers solitary or in pairs; leaves ovate or ovate-cordate, entire or serrate, about ·5 in. long, subsessile . . . . . 3. *scabra*.

Capsule longer than the calyx; placentiferous dissepiment narrowly winged :—

Calyx not divided to the base in flower, scarcely so in fruit; capsule ellipsoid :—

Erect simple or little-branched herb with suborbicular, shortly serrate leaves up to ·75 in. long and broad, nearly sessile; pedicels very slender . . . . . 4. *nummularifolia*.

Much branching low herb with ovate-cordate or suborbicular, crenate-serrate leaves ·7–1 in. in diam. nearly sessile; pedicels none, the flowers congested in the leaf axils . . . . . 5. *sessiliflora*.

Calyx divided to the base in narrow linear-lanceolate lobes; narrowly

oblong; capsule ·3–·5 in. long; pedicels usually axillary, deflexed in fruit; leaves ovate, obtuse or subacute, obscurely crenate-serrate, up to 1 in. long, petiole about ·1 in. long .....6. ***pedunculata***.

Leaves with 3–5 ribs from the base, sessile, elliptic, obtuse, up to ·75 in. long; calyx divided to the base, shorter than the ovoid capsule, whose placentiferous dissepiment is tufted at top, but scarcely winged, the calyx-lobes linear, hispid at tip; pedicels solitary, axillary, filiform, longer than the leaves; staminal appendages subulate....7. ***pyxidaria***.

1. VANDELLIA CRUSTACEA, Benth.; F. B. I. iv. 279; Wt. Ic. t. 863.

   All plains Districts, usually in wet places or rice fields, often in gardens.

   A glabrous or pubescent annual herb, branching diffusely and rooting, the corolla purplish or white.

2. VANDELLIA HIRSUTA, Ham.; F. B. I. iv. 280.

   W. Coast, S. Canara to Travancore, in fields.

   A pubescent erect herb, with pale violet corolla and globose capsule.

3. VANDELLIA SCABRA, Benth.; F. B. I. iv. 281.

   W. Deccan, W. Ghâts and W. Coast, up to 4,000 ft., in rice fields, etc

   A diffuse herb with corolla having the lower lip white and the upper one brown (Lawson).

Var. *laxa* Hook. f. Much elongate and very slender, the leaves so reduced that the inflorescence becomes a raceme; lower leaves rather larger. Without locality (Wight); Guindy (Lawson)

4. VANDELLIA NUMMULARIFOLIA, D. Don.; F. B. I. iv. 282.

   Hills of Coimbatore, at Minchiguli, 4,800 ft. (Fischer). Nilgiris, at Naduvatum, 6,000 ft. (Lawson).

   A small herb with red-purple corolla.

5. VANDELLIA SESSILIFOLIA, Benth.; F. B. I. iv. 282.

   W. Ghâts, Nilgiri, Anamalai and Pulney Hills at 2,000–6,000 ft. (Lawson, Fischer).

   An erect herb with close clusters of sessile flowers, often cleistogamic (Lawson).

6. VANDELLIA PEDUNCULATA, Benth.; F. B. I. iv. 282.

   N. Circars, on the Godavari (Bourne); W. Ghâts, in the Anamalai and Pulney Hills, up to 2,000 ft.; W. Coast, in Travancore, in rice fields and other wet places.

A creeping herb with long branches rooting at the lower nodes, the corolla white with a pale violet margin or pale blue with a white spot.

7. VANDELLIA PYXIDARIA, Maxim. *V. erecta*, Benth.; F. B. I. iv. 281.

N. Circars in the Upper Godavari (Gamble); Gazalhati Pass, N. Coimbatore (Wight).

A slender divaricatingly branched herb with small apparently white flowers.

16. Ilysanthes, Rafin. (including *Bonnaya*, Link and Otto).

Annual glabrous herbs, usually of marshes. *Leaves* opposite, entire or toothed, ribbed from the base or penninerved. *Flowers* small, axillary and solitary or in terminal racemes, bracteate, not bracteolate, peduncles often deflexed in fruit. *Calyx* 5-lobed, usually deeply the lobes narrow. *Corolla* 2-lipped; tube cylindric, or widening above; upper lip outside, broad, usually shortly bifid, lower spreading, 3-lobed. *Stamens* 2, upper alone perfect, subincluded; lower reduced to 1–2-lobed often glandular hairy staminodes. *Ovary* with many ovules; style slender; stigma 2-lamellate. *Fruit* an ovoid oblong or linear septicidal capsule, the valves entire, separating from the placentiferous septum. *Seeds* numerous, rugose.

Leaves with 3–5 ribs from the base; staminodes usually bilobed; capsule ovate or shortly oblong :—

Erect herbs, 4–18 in. in height :—

Corolla rather large, ·3–·5 in. long or longer, glandular-hairy within; lower leaves oblong or oblong-lanceolate up to ·75 in. long, upper linear smaller; flowers solitary, axillary, the pedicels filiform, up to 1 in. long, deflexed in fruit; capsule ovoid-oblong, up to ·25 in. long
1. *hyssopioides.*

Corolla small, about ·25 in. long; lower leaves ovate lanceolate or oblong, up to 1 in. long, upper smaller; flowers solitary axillary or in slender terminal racemes, the pedicels filiform, up to ·75 in. long; capsule ovoid-oblong up to ·2 in. long .....2. *parviflora.*

Erect minute herbs with single stems under 3 in. high; corolla ·2–·3 in. long, the lobes broadly spreading; leaves ovate- or elliptic-oblong, under ·25 in. long, obtuse; pedicels capillary; capsule subglobose
3. *minima.*

Creeping and rooting herbs with stems up to 10 in. long; corolla ·3

·4 in. long, the lips spreading; leaves ovate or orbicular, ·3–·5 in. in diam., obtuse, entire or slightly dentate; pedicels very short; capsule globose ..... 4. *rotundifolia.*

Leaves penninerved; staminodes entire; capsule narrow, linear :—

Leaves sharply deeply and closely serrate :—

Erect, diffusely branched; leaves sessile, oblong, obtuse or subacute, glabrous, spinous-serrate, up to 1 in. long, ·5 in. broad; flowers in lax terminal racemes with subulate bracts, pedicelled; capsules narrowly linear-oblong, ·5 in. long .....5. *serrata.*

Prostrate, creeping and rooting at the nodes; leaves petioled, elliptic-oblong, rounded at apex, finely serrate, up to 2 in. long, ·75 in. broad; flowers in axillary and terminal racemes with narrow lanceolate bracts; capsules very slender, ·75 in. long.....6. *reptans.*

Leaves distantly and shallowly serrate :—

Stems decumbent at base, rooting at the nodes, the branches ascending; leaves oblong obovate-lanceolate or oblanceolate, up to 1·5 in. long, ·4 in. broad, broadly petioled to sessile; flowers in terminal and axillary racemes with linear-lanceolate bracts, sometimes solitary; capsules up to ·5 in. long .....7. *veronicaefolia.*

Stems erect, short, much-branched; leaves linear-oblong, shortly and distantly serrate, up to 1 in. long, ·15 in. broad, sessile · flowers in leafy terminal or axillary racemes, the bracts setaceous; capsules up to ·4 in. long .....8. *oppositifolia.*

Leaves entire or very nearly so, linear, up to 1·5 in. long and very narrow, scarcely over ·1 in. broad, sessile; flowers in slender racemes terminal or axillary, sometimes solitary, the slender pedicels deflexed, bracts subulate; capsules very slender, up to ·5 in. long ..9. *tenuifolia.*

1. ILYSANTHES HYSSOPIOIDES, Benth.; F. B. I. iv. 283; Wt. Ic. t. 857.

Most Districts, in wet places, especially rice fields, up to 4,000 ft. in the hills.

A straggling slender herb reaching 18 in. in height, the flowers pale blue or white with darker markings, sometimes nearly 1 in. long, the staminodes large and clavate, obscurely bilobed, glandular.

2. ILYSANTHES PARVIFLORA, Benth.; F. B. I. iv. 283. *Gratiola parviflora*, Roxb. Cor. Pl. t. 203.

Most Districts in the plains, in wet places.

An erect branching herb, smaller than the last and with smaller blue or white flowers, the staminodes bilobed.

3. ILYSANTHES MINIMA, Benth.; F. B. I. iv. 284.

Vandalur in Chingleput (Bourne); Tinnevelly, about Pallamcottah, in rice fields (Wight).

A minute erect herb with rather large yellow flowers.

4. ILYSANTHES ROTUNDIFOLIA. Benth.; F. B. I. iv. 284. *Gratiola rotundifolia*, Linn.; Roxb. Cor. Pl. t. 204.

E. Coast (*fide* Roxburgh); W. Coast, S. Canara to Travancore, in wet places, banks of ponds, etc.

A creeping herb with round leaves and white flowers, the staminodes rather large.

5. ILYSANTHES SERRATA. Urban. *Bonnaya brachiata*, Link and Otto; F. B. I. iv. 284.

All plains Districts and up to about 4,000 ft. in the hills, in wet places, pasture lands, on rocks, etc., common.

A stiff erect herb with pink, purple or white flowers

6. ILYSANTHES REPTANS. Urban. *Bonnaya reptans*, Spr; F. B. I. iv. 284. *B. veronicaefolia*, Wt. Ic. t. 1411 *not* of Spr. Madras (Shuter); Malabar (Wight); Travancore (Bourdillon, Venkoba Row) in swampy places.

A creeping herb with light purple flowers.

7. ILYSANTHES VERONICAEFOLIA, Urban. *Bonnaya veronicaefolia*, Spr.; F. B. I. iv. 285. *Gratiola veronicaefolia*, Roxb. Cor. Pl. t. 154. *G. grandiflora*, Roxb. l. c. t. 179. *Bonnaya verbenaefolia*, Spr.; Wt. Ic. t. 1412.

All Districts in the plains and up to 5,000 ft. in the hills, in wet places, common.

A very variable species, whether in habit, in leaf or in flower, the flowers usually violet with darker lines. The varieties *grandiflora* and *verbenaefolia* are connected by intermediates with the species.

8. ILYSANTHES OPPOSITIFOLIA, Urban. *Gratiola oppositifolia*, Roxb. Cor. Pl. t. 155. *Bonnaya oppositifolia*, Spr.; F. B. I. iv. 286.

Deccan and Carnatic, also W. Coast, in wet places, not common.

A small inconspicuous plant with blue flowers.

9. ILYSANTHES TENUIFOLIA. Urban. *Bonnaya tenuifolia* Spr.; F. B. I. iv. 286.

W. Coast, Malabar and Travancore.

A small very slender tufted weak marsh herb with pale blue flowers.

17. Microcarpaea, R. Br.

A very small slender diffuse or creeping nearly glabrous herb. *Leaves* opposite, sessile, oblong obtuse, entire. *Flowers* minute, axillary, solitary, sessile; bracteoles 0. *Calyx* tubular, 5-angled, 5-lobed, the ribs thick. *Corolla* very short; tube broad; lobes 5, broad, spreading, the 2 upper partially connate. *Stamens* 2 perfect; filaments filiform; anthers confluent, 1-celled; staminodes 0. *Ovary* many-ovuled; style filiform; stigma capitate recurved. *Fruit* a small ovoid loculicidal capsule, included in the calyx, valves separating from the placentiferous dissepiment. *Seeds* very small, ellipsoid.

MICROCARPAEA MUSCOSA, R. Br.; F. B. I. iv. 287.

W. Coast, S. Canara to Travancore, in marshy places.

A minute tufted slender herb, the branches interlacing, the stems rooting at the nodes, the leaves about ·25 in. long.

18. Peplidium, Delile.

Small prostrate or creeping glabrous herbs. *Leaves* opposite, fleshy, entire, more or less obovate. *Flowers* small, axillary, subsessile, 1–3-nate. *Calyx* tubular, 5-ribbed, obtusely 5-lobed, enlarged and ovoid-globose in fruit. *Corolla*-tube short; lobes 5, broad subequal or one broader. *Stamens* 2, included; filaments broad, curved; anthers 1-celled; staminodes 0. *Ovary* many-ovuled; style short; stigma large, flat, recurved over the anthers. *Fruit* a globose or ovoid capsule, the walls fragile, bursting irregularly, the placentiferous dissepiment winged. *Seeds* numerous, angular, truncate, dotted.

PEPLIDIUM MARITIMUM, Wettst. *P. humifusum*, Del.; F. B. I. iv. 287. *Microcarpaea cochlearifolia*, Sm.; Wight in Hook. Bot. Misc. iii. Suppl. t. 29.

E. Coast Districts, on the margins of tanks and in similar wet places; W. Ghâts, swamps and ponds in the Pulney Hills (Bourne).

A small prostrate herb, rooting at the nodes, the small flowers pale pink, the capsules bursting very easily, the leaves orbicular obovate or spathulate.

19. Glossostigma, Arn.

Minute glabrous creeping herbs. *Leaves* opposite or fascicled, linear or spathulate, entire. *Flowers* minute, axillary, solitary, bracteoles 0. *Calyx* campanulate, obtusely 3–4-lobed. *Corolla*-tube short; lobes 5, subequal, spreading. *Stamens* 2 (in the Indian species) or 4; filaments filiform; anthers with diverging cells, their tips confluent. *Ovary* many-ovuled; style short; stigma dilated, spathulate, recurved. *Fruit* a small loculicidal capsule, enclosed in the calyx; valves entire, separating from the columnar not winged placentiferous axis. *Seeds* minute, ellipsoid.

GLOSSOSTIGMA SPATHULATUM, Arn.; F. B. I. iv. 288. *Microcarpaea spathulata*, Benth.; Wight in Hook. Bot. Misc. ii. Suppl. t. 4.

Carnatic. margins of tanks and other wet places.

A minute tufted herb creeping and rooting at the nodes, the branches much interwoven. The flowers in Wight's fig. are pale pink.

20. Scoparia, Linn.

Herbs or undershrubs, with twiggy branches. *Leaves* opposite or whorled, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or binate; bracteoles 0. *Calyx* small, 4–5-partite, the lobes imbricate. *Corolla* rotate, 4-lobed, the throat densely bearded; lobes obtuse, subequal. *Stamens* 4, subequal; filaments filiform; anther-cells distinct, parallel or diverging. *Ovary* with many ovules; style subclavate stigma notched or truncate. *Fruit* a small globose or ovoid septicidal capsule, enclosed in the calyx, the valves membranous. separating from the placentiferous axis. *Seeds* many, angled, scrobiculate.

SCOPARIA DULCIS, Linn.; F. B. I. iv. 289.

All plains Districts and to about 3,000 ft. on dry hills, a tropical American plant now run wild and very common in India, on waste lands and fallow fields.

A glabrous undershrub sometimes up to 3 ft. in height, with small white flowers and lanceolate or elliptic-lanceolate coarsely serrate leaves.

21. Veronica, Linn.

Herbs or shrubs, rarely trees. *Leaves* opposite, the upper ones only or sometimes all occasionally alternate. *Flowers* solitary axillary, or in terminal or axillary racemes, bracteate but not bracteolate. *Calyx* 4–5-partite, the lower lobes connate, the upper if present smaller. *Corolla* rotate or shortly salver-shaped, blue purple or white; lobes 4 or 5, the upper and lower usually narrower. *Stamens* 2, exserted, adnate to the corolla-tube on either side of the upper lobe; anther-cells confluent at their tips. *Ovary* many- or few-ovuled; style simple; stigma subcapitate. *Fruit* a compressed or turgid 2-grooved capsule, dehiscing in various ways. *Seeds* many or few, smooth or rugose, sometimes winged.

Prostrate herbs, the leaves of flowering branches alternate; flowers solitary in the leaf-axils :—

Pedicels about as long as the leaves; capsule-cells globose, turgid, hispid; leaves ovate-cordate or orbicular, coarsely serrate, up to ·75 in. in diam. ..... 1. *agrestis.*

Pedicels much longer than the leaves; capsule-cells flattened, reticulate; leaves ovate, coarsely crenate-serrate, up to 1·5 in. long ..... 2. *persica.*

Erect herbs, capsules broadly obcordate :—

Flowers in long terminal bracteate racemes; leaves very small, ovate-cordate, crenate, subsessile, those of the flowering raceme alternate ..... 3. *arvensis.*

Flowers in axillary slender racemes; leaves rather large, ovate, crenate-serrate, truncate at base, opposite ..... 4. *javanica.*

1. VERONICA AGRESTIS, Linn.; F. B. I. iv. 294.
   Nilgiri Hills, usually above 5,000 ft., a weed of cultivation, probably introduced.
   A prostrate annual weed with small blue flowers.
2. VERONICA PERSICA, Poir.; F. B. I. iv. 294.
   Nilgiri Hills, about Ootacamund, at 7,000 ft., a weed of cultivation, probably introduced but likely to spread as in other countries.
   A prostrate annual weed with rather large blue flowers.
3. VERONICA ARVENSIS, Linn.; F. B. I. iv. 296.
   Nilgiri Hills, above 6,000 ft., a weed of cultivation and waste land, probably introduced.

An erect annual weed, with very small blue or white flowers.

4. VERONICA JAVANICA, Bl.; F. B. I. iv. 296.
W. Ghâts, Nilgiris, Pulneys and hills of Travancore above 6,000 ft.
A pubescent annual herb with many-branched slender stems and small flowers and capsules.

22. Buchnera, Linn.

Annual rigid herbs, black when dry. *Leaves*: lower opposite, broad; upper alternate, narrow. *Flowers* sessile, axillary or in bracteate spikes, bracteoles 2. *Calyx* tubular, 5-lobed, 10-ribbed, the lobes short. *Corolla*-tube slender; lobes 5, flat, subequal, spreading, the upper inmost in bud. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, the connective sometimes mucronate. *Ovary* with many ovules; style thickened or clavate above; stigma entire or notched. *Fruit* an oblong loculicidal capsule; valves entire, coriaceous, separating from the placentas. *Seeds* very many, angled, obovoid or oblong.

BUCHNERA HISPIDA, Ham.; F. B. I. iv. 298; Wt. Ic. t. 1413.
Most Forest Districts, in grassy places.
An erect hispid herb with pale purple flowers growing to about 18–24 in. in height, the lower leaves obovate or oblong, coarsely serrate, the upper lanceolate or linear.

23. Striga, Lour.

Herbs, usually scabrid, discoloured or black when dry, generally parasitic. *Leaves*: the lower opposite, the upper alternate, linear, entire, rarely toothed, sometimes reduced to scales. *Flowers* axillary or the upper in bracteate spikes; bracteoles usually 2. *Calyx* tubular, the tube with 5, 10 or 15 ribs; lobes 5. *Corolla*-tube slender, abruptly incurved at or above the middle; limb spreading, the upper lip inner in bud, usually short, notched or 2-fid, the lower 3-lobed. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, the connective sometimes mucronate. *Ovary* many-ovuled; style slender, thickened upwards; stigma entire. *Fruit* an oblong obovoid or subglobose capsule, loculicidal, the valves entire septiferous, separating

rom the placentas. *Seeds* very many, ovoid or oblong, usually reticulate.

Calyx 5-ribbed, the ribs running to the apex of each lobe :—
A reddish-brown root parasite with tuberous rootstock, often many branched ; leaves scale-like ; corolla pink .....1. ***orobanchoides.***
A green plant, not recorded as parasitic, the root not tuberous, little branched ; leaves linear with crustaceous glandular scabrid margins ; corolla white .....2. ***densiflora.***
Calyx 10-ribbed, occasionally 15-ribbed, but the secondary ribs always ending at the sinus between the lobes, the ribs with stiff hairs on bulbous bases ; an erect parasitic herb, little branched ; leaves linear ; corolla yellow or sometimes white .....3. ***lutea.***
Calyx 15-ribbed, all ribs continued to the apex of the lobe :—
Corolla small, white, tube under ·75 in. long, limb about ·5 in. in diam. ; calyx-ribs usually with crustaceous glands bearing minute spines and sometimes almost quite white ; leaves linear, up to 2 in. long and sometimes with 1–2 teeth on the margins ; parasitic
4. ***euphrasioides.***
Corolla large, tube over ·75 in. long, limb nearly 1 in. in diam. ; calyx slender, the lobes long acuminate with close glandular and pubescent ribs ; leaves linear, up to 2 in. long, narrow
5. ***Masuria.***

1. STRIGA OROBANCHOIDES, Benth. ; F. B. I. iv. 299; Wt. Ic. t. 1414.
Deccan, in most Districts; Carnatic, in Tinnevelly; W. Ghâts, in S. Canara and Malabar, up to 6,000 ft. in the hills, usually on red and gravelly soils.
A parasitic plant found on the roots of various plants, chiefly on *Lepidagathis* in Acanthaceae (Wight and others), also on *Euphorbia antiquorum* (Fischer), ***Dysophylla*** (Barber). The pink corolla has a white spot at the base of each lobe. The calyx is hispid-pubescent, the flowers in dense terminal spikes with short bracts.
2. STRIGA DENSIFLORA, Benth. ; F. B. I. iv. 299.
N. Circars, Deccan and Carnatic.
An erect scabrid herb, the leaves up to 1·5 in. long, very narrow, the flowers in slender spikes with long bracts and linear bracteoles, the calyx with crustaceous glandular subulate lobes.

3. STRIGA LUTEA, Lour.; F. B. I. iv. 299.

All Districts and up to 7,000 ft. in hills, in dry grassy places and among crops.

An erect scabrous hirsute branching parasitic herb, usually pale when dry, the leaves up to 1·5 in. long, very narrow and rough, the flowers in slender spikes with long bracts and minute bracteoles. Watt in Comml. Prod. Ind. records it as parasitic and harmful on sugarcane and Sorghum. I have found it myself on the latter.

4. STRIGA EUPHRASIOIDES, Benth.; F. B. I. iv. 299; Wt. Ic. t. 855.

Most Districts, both in the plains and up to about 4,000 ft. in the hills.

A very variable erect herb either slender and rather short, turning black when dry, or stout and branching and greenish-grey when dry. Duthie (Fl. Gang. Pl. ii. 157) says that it is parasitic and destructive in crops of sugarcane and Sorghum, but this is not recorded from Madras. The leaves reach 2 in. in length and are scabrous.

5. STRIGA MASURIA, Benth.; F. B. I. iv. 300.

Carnatic, at Guindy near Madras (Shuter).

A slender erect scabrid herb.

24. Alectra, Thunb.

Erect rigid usually scabrid herbs, black when dry. *Leaves* opposite or alternate, sometimes reduced to scales. *Flowers* in terminal spikes or racemes, bracteate and bracteolate. *Calyx* campanulate, 5-lobed, the lobes valvate or open in bud. *Corolla* tube broad, the limb oblique; lobes 5, spreading, the lower outer in bud. *Stamens* 4, didynamous, the anthers touching in pairs; cells parallel, their bases mucronate. *Ovary* 2-celled; ovules very many; style simple; stigma elongate, oblong-clavate. *Fruit* a subglobose or ovoid loculicidal capsule, the valves entire, bearing the placentas. *Seeds* very many, minute, linear-cuneate, the testa lax, reticulate longitudinally.

ALECTRA THOMSONI, Hook. f.; F. B. I., iv. 297.

N. Circars, Ethakonda in Godavari, 1,700 ft. (V. Narayanswami).

An erect stiff herb with stems having the leaves reduced to green brown or purple scales, and corolla yellow with red

nerves. It is apparently parasitic and usually on Acanthaceae like *Strobilanthes auriculatus*.

25. Rhamphicarpa, Benth.

Erect glabrous herbs, drying black. *Leaves*: lower opposite, upper alternate, narrow, entire or pinnatisect. *Flowers* axillary and pedicelled or in bracteate racemes; bracteoles 1–2 or 0. *Calyx* campanulate with 5 acuminate lobes. *Corolla*-tube slender, elongate, straight or incurved; lobes 5, broad, spreading, subequal or the upper connate. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed. *Ovary* many-ovuled; style slender, thickened above; stigma simple. *Fruit* a capsule compressed at right angles to the septum, usually beaked, loculicidal; valves septiferous, placentas large. *Seeds* small, obovoid or oblong; testa reticulate.

RHAMPHICARPA LONGIFLORA, Benth.; F. B. I. iv. 300; Wt. Ic. t. 1415.

W. Coast. in S. Canara, in marshy pastures.

An erect herb reaching 2–12 in. in height with white corolla and beaked capsule, the leaves pinnatisect with filiform segments.

26. Sopubia, Ham.

Erect perennial herbs. *Leaves* opposite, or the upper alternate, narrow, linear trifid or pinnatisect. *Flowers* in spikes or racemes with leafy bracts; bracteoles 2. *Calyx* campanulate, 5-lobed. *Corolla*-tube funnel-shaped, dilated at the throat; lobes 5, spreading, the 2 upper inmost in bud. *Stamens* 4, didynamous, the anthers meeting in pairs; one anther-cell fertile, longitudinally dehiscing, the other small and imperfect. *Ovary* many-ovuled; style slender; stigma thickened and tongue-shaped, obtuse or capitate at apex. *Fruit* an ovoid or oblong loculicidal capsule, the valves entire or bifid, separating from the dissepiment which bears large placentas. *Seeds* numerous, oblong or cuneate, often truncate; testa lax, striate or reticulate.

Calyx-teeth subulate, very slender, glabrous within, longer than the ribbed tube; corolla purple, 1–1·5 in. long, the lobes broad, spreading; sterile anther-cells acuminate; lower leaves pinnatisect 1–1·5 in. long,

the lobes filiform, these passing gradually into trifid and then to **simple floral** bracts; capsule oblong, seeds truncate, striate
1. *delphinifolia.*

Calyx-teeth deltoid-ovate, acute, woolly within, equalling the tube; **corolla** yellow with a purplish eye, under ·5 in. long, the limb rotate; **sterile anther**-cells obtuse; lower leaves trifid, ·5–1·5 in. long, the **lobes linear** or filiform, passing into linear floral bracts; capsule **emarginate**, seeds oblong, spirally reticulate .....2. *trifida.*

1. SOPUBIA DELPHINIFOLIA, G. Don; F. B. I. iv. 302. *Gerardia delphinifolia*, Roxb. Cor. Pl. t. 90.
Deccan, Carnatic and E. side of W. Ghâts, up to 7,000 ft., less common on W. Coast, in rocky places in the forests, fields and grassy slopes.
A pretty erect herb, reaching 1–3 ft. in height. Fyson says it is a root parasite.
2. SOPUBIA TRIFIDA, Ham.; F. B. I. iv. 302.
N. Circars, Mahendragiri in Ganjam at 4,500 ft. (Gamble); Deccan, on Ramandrúg in Bellary (Beddome); W. Ghâts, Bábabudan Hills of Mysore, Nilgiris, Anamalais, Pulneys and Travancore Hills at 3,000–7,000 ft. in grassy pasture land.
A pretty herb, 1–2 ft. high.

27. Micrargeria, Benth.

Rigid scabrid erect herbs, black when dry. *Leaves* alternate **or the lower** opposite, entire or pinnatifid. *Flowers* small, in the upper axils or in long terminal bracteate spikes or racemes; bracteoles 2. *Calyx* campanulate or hemispheric; lobes 5, broad. *Corolla*-tube dilated above, incurved; lobes 5, broad, spreading, **entire**, subequal, the 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers free, meeting in pairs, cells distinct, subequal, attached by their tips. *Ovary* many-ovuled; style slender; **stigma**, tongue-shaped. *Fruit* a small globose loculicidal capsule; **the valves** separating from 2 small globose placentas. *Seeds* **numerous**, oblong-cuneate; testa lax.

MICRARGERIA WIGHTII, Benth; F. B. I. iv. 303; Wt. Ic. t. 1417.
Deccan, in Mysore and Coimbatore; Carnatic in Tinnevelly.
An erect herb reaching 18 in. high, with small corolla and

pubescent much cut leaves, the lobes filiform in upper ones, spathulate in lower.

28. Centranthera, R. Br.

Scabrid herbs, probably more or less parasitic. *Leaves* opposite or the upper alternate, entire or toothed. *Flowers* axillary or in bracteate spikes or racemes; bracteoles 2. *Calyx* spathaceous, split on one side, compressed, entire or shortly 3–5-lobed. *Corolla*-tube long, tubular or funnel-shaped, incurved and dilated above; limb oblique; lobes subequal, spreading, the 2 upper inside in bud. *Stamens* 4, didynamous, included; anthers meeting in pairs, cells transverse, spurred or mucronate at base; one cell often imperfect. *Ovary* with many ovules; style simple, dilated above; stigma tongue-shaped, acute. *Fruit* an ovoid or subglobose loculicidal capsule; valves entire, the placentas in the middle. *Seeds* very many, conical or cuneate; testa lax, reticulate.

Leaves oblong; corolla funnel-shaped; leaves hispid, the hairs on tubercular bases; seeds conical, the testa spirally reticulate :—

Calyx ·25 in. long, ovate, acute; corolla rose-coloured or white, up to ·75 in. long; leaves elliptic- or linear-oblong, up to 1·5 in. long; lower filaments pilose ..... 1. *hispida.*

Calyx ·5 in. long or longer, oblong, acute; corola white with a brownish-red blotch in the tube, ·75–1 in. long; leaves oblong, the tubercles conspicuous, ·5–1 in. long; all filaments pilose 2. *indica.*

Leaves linear, up to 1 in. long, sparsely tubercular-hispid; corolla tubular, short, yellow; calyx ovoid, ·2 in. long, obtuse or subacute; filaments glabrous; seeds cuneate, truncate, the testa reticulate with shining areoles ..... 3. *humifusa.*

1. CENTRANTHERA HISPIDA, R. Br.; F. B. I. iv. 301; Wall. Pl. As. Rar. t. 45.

   Deccan, in Mysore, up to 3,000 ft.; W. Coast, S. Canara to Travancore in wet places and rice-fields.

   An erect herb reaching 2 ft. in height.

2. CENTRANTHERA INDICA, Gamble n. comb. *C. procumbens*, Benth.; F. B. I. iv. 301; Trimen Fl. Ceyl. t. 68.

   W. Coast in Malabar and Travancore (Wight, Fischer); S. E. Wynaad (Beddome), in wet places.

An erect diffuse herb with bright orange-coloured roots (Trimen).

3. CENTRANTHERA HUMIFUSA, Wall.; F. B. I. iv. 301.
E. Coast, Tada in Nellore (Bourne); W. Coast, S. Canara to Travancore, in wet places.
A diffuse small, erect or prostrate, herb.

29. Pedicularis, Linn.

Perennial or rarely annual semiparasitic herbs. *Leaves* alternate opposite or whorled, pinnatifid or pinnatisect. *Flowers* in bracteate terminal spikes or racemes; bracteoles 0. *Calyx* tubular or campanulate, entire or split down one side, 2–5-toothed, lateral teeth free or connate, entire or crested, lower small or 0. *Corolla* 2-lipped; tube cylindric; upper lip erect, hooded compressed obtuse acute or beaked; lower with 3 spreading or deflexed lobes. *Stamens* 4, didynamous; anthers under the upper lip meeting in pairs; cells distinct, equal, parallel, both perfect. *Ovary* many-ovuled; style slender; stigma subcapitate. *Fruit* a compressed capsule, usually more or less oblique and often beaked, loculicidal; valves often joined to the middle. *Seeds* numerous, various in shape and markings of the testa, usually reticulate.

Calyx ·25–·5 in. long, cleft to near the base, the teeth crested; corolla rose-pink, ·75–1 in. long, the upper lip very slightly beaked; capsule obliquely ovate-falcate, ·6 in. long; leaves oblong, prominently crenate, up to 2·5 in. long, ·6 in. broad, pubescent.....1. *zeylanica.*
Calyx 1 in. long, tubular, the teeth crested; corolla white, 3–6 in. long with slender tube, the upper lip rounded; capsule falcate, 1 in. long; leaves pinnatifid, cut more than half way to the midrib with crenate lobes, 1·5–2·5 in. long, glandular-hairy.....2. *Perrottetii.*

1. PEDICULARIS ZEYLANICA, Benth.; F. B. I. iv. 317; Wt. Ic. t. 1419; Prain Ann. Calc. iii. 153. t. 14.
W. Ghâts, in all Districts at about 5,000–7,000 ft. in open grass lands in dampish localities; Shevaroy Hills of Salem.
A handsome species of which there are two forms, one erect up to about 2 ft. high, the other branching near the ground and diffuse, but they have no varietal differences.

2. **Pedicularis Perrottetii**, Benth.; F. B. I. iv. 317; Wt. Ic. t. 1418; Prain Ann. Calc. iii. 119. t. 8.
   W. Ghâts, Nilgiris above 7,000 ft., not rare near Avalanché and Nilgiri and Makurti Peaks in the Kundahs; Anamalais above Iyerpadi, 7,000 ft. (Barber), on grass lands.
   A striking species with very long corolla-tube. The host plant, if any, has not been recorded.

Calceolaria mexicana, Benth., is a pretty yellow-flowered weed from Mexico now naturalised on the higher parts of the Nilgiris and Pulneys, also on the hills of N. Coimbatore and the Bababudan Hills of Mysore. *Antirrhinum Orontium*, Linn., has been found as an escape in the Nilgiris, and *A. majus*, Linn., the Snapdragon, in both the Nilgiri and Pulney Hills. *Scrophularia peregrina*, Linn., a herb of Asia Minor, is found as a roadside weed in the Nilgiris (Bourne). *Digitalis purpurea*, Linn., the Foxglove, is said to have lately run wild in the Nilgiris. Many handsome-flowered species may be found in gardens, such as those of *Alonsoa*, *Angelonia*, *Maurandia*, *Pentstemon*, *Russelia*.

Family CVIII. OROBANCHACEAE.

Leafless root-parasites; stem usually simple, sometimes branched, the stem or branches with scales. *Flowers* hermaphrodite, irregular, solitary or in spikes or racemes; bracts large, scale-like; bracteoles 1–2 scale-like, or 0. *Calyx* spathaceous or 2-lipped or with 4 or 5 free or connate lobes. *Corolla* hypogynous, curved, usually 2-lipped, sometimes subequally 5-lobed; upper lip often arched, lower 3-lobed, throat often with 2 villous folds. *Stamens* 4, didynamous, adnate to the corolla tube; anthers 1–2-celled, one cell often imperfect, cells frequently spurred at the base, dehiscence by slits or apical pores. *Disk* usually obscure. *Ovary* of 2 rarely 3 connate carpels, 1- rarely 2-celled; ovules many, on free or confluent parietal placentas. *Fruit* a capsule, usually 1-celled; valves 2 rarely 3. *Seeds* many, minute; testa pitted or reticulate; albumen fleshy; embryo ovoid, often undivided.

Corolla-lobes broad, subequal, spreading :—
  Calyx spathaceous, split in front nearly to the base; anther-cells unequal ..... 1. **Aegiphila**
  Calyx tubular-campanulate, 5-lobed :—

Anthers 2-celled, 1 cell often imperfect, spurred at base; stigma peltate .....2. **Christisonia.**

Anthers 1-celled, not spurred; stigma clavate....3. **Campbellia,**

Corolla 2-lipped, upper lip 2-lobed, lower 3-lobed; anther-cells equal 4. **Orobanche.**

1. Aeginetia, Linn.

Leafless herbs with simple or branched, naked or scaly scapes or stems. *Flowers* few, large, solitary or corymbose; bracteoles 0. *Calyx* spathaceous, split in front nearly to the base. *Corolla*-tube broad, incurved. obscurely 2-lipped; lobes 5, broad, spreading, the two upper connate, outer in bud. *Stamens* 4, didynamous, included; anthers meeting in pairs with 1 perfect cell adnate to the filament not spurred below, the other absent from the upper pair, empty clavate and deflexed in the lower *Ovary* 1-celled; placentas 2- or more-lobed, filling the cavity bearing ovules all over; style slender; stigma large, peltate *Fruit* a partially 2-valved capsule. *Seeds* crowded, minute, reticulate.

Scape slender, naked; corolla deep purple-red; placentas multifid 1. *indica*

Scape short, stout, bracteate; corolla-tube yellow, mouth blue; placentas 2-lamellate.....2. *pedunculata*

1. AEGINETIA INDICA, Linn.; F. B. I. iv. 320; Roxb. Cor. Pl. t. 91; Wt. Ic. t. 895.

Hills of the N. Circars; W. Ghâts, in almost all Districts up to about 3,000 ft.

Parasitic herb of a purplish red colour, the root of interlaced fleshy fibres. It grows apparently on the roots of many different plants.

2. AEGINETIA PEDUNCULATA, Wall. Pl. As. Rar. t. 219; F. B. I. iv. 320; Wt. Ic. t. 1421.

W. Ghâts, S. Canara to Travancore, up to 4,000 ft.

Parasitic on the roots of grasses. A reddish or yellowish herb with short stem underground and many often long branches with sheathing bracts, the calyx orange colour.

2. Christisonia, Gardn.

Fleshy parasitic herbs, the stems simple or tufted on the root-stock and bearing alternate obtuse or acute scales instead of

leaves. *Flowers* usually peduncled, with or without bracteoles. *Calyx* tubular, 2-lipped or with 5 lobes. *Corolla*-tube tubular or funnel-shaped, straight or slightly curved, the mouth with 5 nearly equal lobes or obsurely 2-lipped. *Stamens* 4, usually included; filaments stout, anthers 2-celled, one cell perfect the other imperfect and spurred, the upper pair sometimes with both cells perfect. *Ovary* 1-celled, placentas large, 2- or more-lobed, bearing all over very numerous ovules; style long; stigma large, peltate. *Fruit* a partially 2-valved capsule. *Seeds* very many, minute, testa reticulate.

Stems elongate, up to 12 in. long or longer, with few distant peduncled flowers with one bract, no bracteoles, glabrous except the corolla; anthers 2-celled, one fertile, the other sterile sharply spurred; calyx subbilabiate :—

Stem scales very small, under ·25 in. long, obtuse, bracts rather longer; calyx-tube ·5 to 1 in. long with triangular lobes; corolla large, up to 2·5 in. long, the lobes broad, rounded, spreading, 1·5 in. in diam. at the mouth ..... 1. *tubulosa.*

Stem scales oblong, up to ·5 in. long, obtuse, bracts longer; calyx-tube ·5–·75 in. long, the lobes triangular; corolla rather small, up to 1·5 in. long, the lobes short, obtuse, suberect, ·75 in. in diam. at the mouth ..... 2. *Saulièrei.*

Stems short, up to about 8 in. long, glandular-hairy, with many ovate obtuse pubescent scales, flowers up to about 10, corymbosely arranged on stout peduncles or nearly sessile, bracteoles 2, large; anthers 2-celled, one perfect, the other imperfect long and sharply spurred; calyx and corolla each tubular, glandular-hairy with equal lobes 3. *bicolor.*

Stems very short, scarcely 1 in. long or none, glabrous, with large scales: flowers crowded on stout short peduncles without bracteoles; anthers: those of longer stamens with 1 perfect cell, the other a fleshy spur; those of shorter stamens both perfect; calyx large, 2-lipped, with long acute lobes; corolla longer with equal lobes 4. *subacaulis.*

1. CHRISTISONIA TUBULOSA, Hook. f.; F. B. I. iv. 321. *Oligopholis tubulosa*, Wt. Ic. t. 1422.

W. Ghâts, Mysore, Nilgiris, Anamalais, Pulneys and hills of Tinnevelly and Travancore, usually at about 3,000–4,000 ft., about Courtallum on roots of bamboo (Wight), in S.E. Wynaad on rice (Gamble).

A tall parasitic herb, with large sparse flowers, the stems and calyx light brown, the flowers pink, yellowish on the lower lip.

2. CHRISTISONIA SAULIEREI. Dunn in Kew Bull. 1914, 30.
W. Ghâts, Pulney Hills, at Kodaikanal, 7,000 ft. (Saulière).
A slender erect herb, like the former, but with smaller flowers and shorter peduncles.

3. CHRISTISONIA BICOLOR, Gardn.; F. B. I. iv. 322. *C. aurantiaca*, Wt. Ic. t. 1486; Spic. Neilgh. t. 167.
Nilgiri Hills, sholas at the head of the Ochterlony Valley at 6,000 ft., probably chiefly parasitic on Acanthaceae like *Strobilanthes*; Pulney Hills at Periyar Shola (Bourne); Bolampatti Hills of Coimbatore (Wight).
A fleshy plant with thick brownish yellow scaly stem, orange-coloured calyx and yellow corolla. The Pulney specimens are very small and differ slightly; they are said to have corolla and calyx rose-coloured.

4. CHRISTISONIA SUBACAULIS, Gardn.; F. B. I. iv. 321; Wt. Ic. t. 1423 (corrected in text).
Tinnevelly Hills, about Courtallum, probably parasitic on the roots of bamboos (Trimen in Fl. Ceyl.).
A fleshy plant, scarcely showing above ground and covered with a viscid mucilage. The flowers are white, the margins of the corolla-lobes pale blue (Wt. in MS.).

3. Campbellia, Wt.

Fleshy parasitic herbs with thick rootstock, the stems with many obtuse scales, usually much imbricate, at any rate at first. *Flowers* peduncled, in crowded heads; bracteoles 2. *Calyx* tubular-campanulate with 5 equal lobes. *Corolla* funnel-shaped, more or less bilabiate; lobes 5, the upper lip 2- the lower 3-lobed, the lobes spreading. *Stamens* 4, exserted; filaments stout; anthers 1-celled opening by a pore at the apex, the opening then extending upwards. *Ovary* 1-celled; placentas 2, meeting in the centre, bearing very numerous ovules; style simple; stigma ovoid or clavate. *Fruit* an imperfectly 2-celled capsule. *Seeds* very many, minute, oblong; testa loose, reticulate.

CAMPBELLIA CYTINOIDES, Wt. Ic. t. 1425. *Christisonia neilgherrica*, Gardn.; F. B. I. iv. 322.

W. Ghâts, Nilgiri and Pulney Hills, in sholas at about 5,000–7,000 ft., parasitic on roots of *Strobilanthes*.

A thick plant of a yellow colour, at first with the scales much imbricate, but they become more distant as the stem elongates with age. The capsules are often quite globose.

4. Orobanche, Linn.

Scapigerous herbs; scapes simple or branched; scales acute. *Flowers* in spikes or racemes, each with a scale-like bract; bracteoles 2 or 0. *Calyx* unequally 4-fid or bipartite from back to front, the lobes entire or bifid with rarely a fifth lobe. *Corolla* 2-lipped; tube curved, dilated above, circumscissile at the base; upper lip erect, crenulate notched or bifid, lower somewhat spreading, 3-lobed. *Stamens* 4, didynamous, included; anther-cells equal, parallel, the bases usually mucronate. *Disk* 0 or glandular. *Ovary* 1-celled, placentas 4, equidistant or in pairs; ovules very many; style simple; stigma funnel-shaped peltate or somewhat laterally bilobed. *Fruit* a 2-valved capsule, the valves often cohering with the style. *Seeds* very many, small, globose or ovoid.

OROBANCHE CERNUA, Loefl.; F. B. I. iv. 325.

Var. *desertorum*, Beck. *O. nicotianae*, Wt. Ill. t. 158; F. B. I. iv. 326.

N. Circars and Deccan, parasitic on tobacco (see Wight's remarks in Spic. Neilg.) and perhaps other plants.

An erect herb with pale brown stems, the corolla with a white tube and pale blue or violet lobes.

Family CIX. LENTIBULARIACEAE.

Herbs, aquatic or in wet places, often insectivorous. *Leaves* rosulate or, when submerged, capillaceo-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, in 1–many-flowered simple or branched scapes; bracts small or 0; bracteoles 2 or 0. *Calyx* inferior, 2–5-lobed or -partite. *Corolla* 2-lipped, spurred; the upper lip usually the smaller, entire or emarginate, the lower usually much larger, 3–5-lobed. *Stamens* 2, attached to the base of the corolla; filaments curved; anthers 2-celled, dorsifixed, the cells transversely confluent, longitudinally dehiscing. *Ovary* 1-celled, globose; ovules very many, on a free

basal placenta; style short; stigma unequally 2-lobed. *Seeds* very many, minute, exalbuminous.

Utricularia, Linn.

Herbs, floating and rootless, or, on wet ground and rocks, rooting among other plants, sometimes twining, often furnished with minute bladder-like insect traps, sometimes also in floating species with floating supports to the scape. *Leaves* in floating species multifid with capillary segments, in erect or twining species entire. *Flowers* on simple or branched scapes, racemose; pedicels bracteate and often bibracteolate. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped, the upper lip entire or emarginate, the lower larger and lobed, the spur straight or curved. *Stamens* 2; filaments broad. *Ovary* 1-celled, many-ovuled. *Seeds* of various shapes, minute, the testa often lax and reticulate.

Water plants, the stolons submerged; leaves whorled, with capillary segments mostly interspersed with minute bladders :—

Peduncles with a whorl of spongy floats below the inflorescence; pedicels short; seeds tabular prismatic, with 4–6 usually sharp angles and slightly winged margins .....1. *stellaris.*

Peduncles without a whorl of spongy floats; pedicels long :—

Peduncles and pedicels stout; submerged leaves very many, long, sometimes the uppermost with the rhachis inflated; seeds prismatic with sharp angles and slightly winged margins; flowers rather large, usually 3–8.....2. *flexuosa.*

Peduncles and pedicels slender; submerged leaves very short, lobes capillary; seeds lenticular, with a broad dentate corky wing; flowers small, 1–3 .....3. *exoleta.*

Terrestrial plants, the stems rooted in mud or moss or among the roots of other plants; leaves often disappearing before flowering and sometimes capillary and furnished with minute bladders :—

Leaves more or less linear or linear-spathulate :—

Scales and bracts of the scape attached by their base :—

Flowers chiefly blue or purple :—

Scapes erect :—

Pedicels recurved in fruit; seed testa reticulate longitudinally :—

Scapes 3–8 in. high, 3–8-flowered, very slender, sometimes bifid; sepals ovate, acute, subequal; lower lip of corolla large, ·5 in. in diam.; spur long, slender, con-

spicuously curved under the lower lip of the corolla; seeds ellipsoid .....4. *arcuata.*

Scapes 3–6 in. high, 3–10-flowered, rather stout, sometimes bifid; sepals ovate, acute, subequal, decurrent; lower lip of corolla ·25 in. in diam.; spur straight, conical, deflexed; seeds obovoid.....5. *stricticaulis.*

Pedicels not recurved in fruit :—

Scapes slender, simple, 2–6 in. high, 3–6-flowered; sepals ovate, acute; corolla small with obovate upper and orbicular entire lower lip, the latter ·2–·3 in. broad with straight conical spur slightly curved forwards; seeds subglobose, the testa with subhexagonal scrobiculate areoles .....6. *uliginosa.*

Scapes slender, sometimes slightly twining; spur narrowly-conic, curved; seeds reticulate with elongate areoles :—

Scapes short, 4–6 in. long rarely longer, the scales few distant lanceolate; calyx-lobes ovate, acuminate; corolla with obovate upper and broadly ovate reticulate lower lip; seeds reticulate with elongate areoles 7. *graminifolia.*

Scapes long, 6–18 in. long, very slender, with numerous ovate acute small scales; calyx-lobes lanceolate, acuminate; corolla with obovate upper and suborbicular lower lip, the spur often much incurved; seeds globose, scrobiculate (Wight).....8. *squamosa.*

Scapes twining :—

Flowers large, on scapes up to 10 in. long, erect or twining, scales few minute; calyx-lobes ovate, one obtuse, the other acute; corolla with obovate upper and broadly suborbicular lower lip ·5 in. broad, the spur conical and curved, nearly as long; seeds globose, scrobiculate (Wight) 9. *Smithiana.*

Flowers large, on twining often interlacing flexuose scapes up to 2 ft. long, the scales few, ovate, very small; calyx-lobes ovate acuminate, much enlarged and decurrent in fruit; corolla with broadly obovate upper and large sub-orbicular lower lip, ·5–1 in. broad, the spur shorter slightly curved; seeds rhomboid, reticulate 10. *reticulata.*

Flowers very small, on exceedingly slender twining scapes at most 6 in. long, the scales minute, ovate; calyx-lobes

ovate, acute in flower, obtuse in fruit; corolla with ovate obtuse upper and ovate lower lip the spur conical pendent; seeds minute, reticulate, scrobiculate .....11. *scandens.*

Flowers yellow :—

Scapes erect, glabrous; pedicels recurved in fruit; corolla with rounded upper and emarginate lower lip, the palate swollen, the spur as long (·25 in.) slightly curved; seeds obovoid, the testa reticulate.....12. *bifida.*

Scapes filiform, twining; pedicels suberect in fruit; corolla with obovate slightly emarginate upper and similar but larger lower lip, the spur nearly as long and curved outwards; seeds ellipsoid, reticulate .....13. *Wallichiana.*

Scales and bracts of the scape attached by their middle; flowers subsessile; capsule globose, the seed-testa reticulate :—

Spur longer than the lower lip of the corolla, acute and curved upwards; the upper lip oblong-obovate, obtuse, the lower ·2 in. long, the margins somewhat crenulate.....14. *caerulea.*

Spur shorter than the lower lip of the corolla, obtuse and straight; the upper lip obovate, the lower ·3 in. long, slightly more broad, the sides reflexed .....15. *roseo-purpurea.*

Leaves orbicular or reniform, persistent; calyx-lobes very unequal; seeds glochidiate; corolla with the upper lip small suborbicular emarginate, the lower spreading, 5-lobed .....16. *striatula.*

1. UTRICULARIA STELLARIS, Linn. f.; F. B. I. iv. 328; Roxb. Cor. Pl. t. 180; Wt. Ic. t. 1567.

   N. Circars, in standing fresh water; Carnatic, Madras, Tanjore (*fide* Wight).

   A water plant with yellow flowers, only the inflorescence showing above the surface, held up by the floats, which have filiform external pinnules at their apices.

2. UTRICULARIA FLEXUOSA, Vahl; F. B. I. iv. 329. *U. fasciculata*, Roxb.; Wt. Ic. t. 1568.

   N. Circars and Carnatic, chiefly near the coast; W. Coast, in all Districts, in rice-fields, tanks and other fresh-water wet places.

   A water plant with yellow flowers, similar to the former but with longer peduncles, larger flowers and pedicels deflexed after flowering; no floats but occasional inflated upper leaf rhachises; capsules rather large.

3. UTRICULARIA EXOLETA, R. Br.; F. B. I. iv. 329. *U. diantha*, Roem. & Sch.; Wt. Ic. t. 1569.

W. Coast, S. Canara to Malabar, Travancore and Tinnevelly, in wet places.

A small water plant floating in water or sometimes rooting in wet mud, the leaves very small and sparingly lobed, occasionally the whole leaf inflated and linear, especially on mud. Flowers yellow with orange streaks, the spur rather long, the capsules small and globose.

4. UTRICULARIA ARCUATA, Wt. Ic. t. 1571, fig. 1; F. B. I. iv. 330.

Bababudan Hills of Mysore (Law); S. Travancore (Wight).

A pretty delicate species with bluish-purple flowers and prominently curved slender spur. The roots have small round bladders as have the linear-spathulate leaves.

5. UTRICULARIA STRICTICAULIS, Stapf in Herb. Kew. *U. caerulea* var. *stricticaulis*, Koenig. *U. reticulata* var. *uliginosa*, C. B. Clarke; F. B. I. iv. 331. *U. humilis*, Wt. Ic. t. 1572, 2, *not of* Vahl.

N. Circars, frequent in Ganjam (Gamble); Deccan and Carnatic, Mysore, Madras and Nellore.

A rather thick-stemmed plant with blue flowers and prominent fruiting calyx, the leaves linear, very narrow, the root bladders very small.

6. UTRICULARIA ULIGINOSA, Vahl. *U. affinis*, Wt. Ic. t. 1580, fig. 1; F. B. I. iv. 330. *U. brachypoda*, Wt. Ic. t. 1578, fig. 1.

W. Ghâts, S. Canara and Mysore to Nilgiris and Travancore, up to 7,000 ft. in the hills in swampy land, more common northwards.

A small rather obscure species with bluish-purple flowers and conical spur. The linear-oblong obtuse leaves and small bladders are very evanescent.

7. UTRICULARIA GRAMINIFOLIA, Vahl. *U. caerulea*, C. B. Clarke; F. B. I. iv. 331, *not of* Linn. *U. pedicellata*, Wt. Ic. t. 1578, fig. 2. *U. uliginoides*, Wt. Ic. t. 1573. *U. conferta*, Wt. Ic. t. 1575.

W. Ghâts, in all Districts, especially Nilgiris and Pulneys, in bogs and other wet places at high levels, common.

A slender species with bluish-purple flowers and linear leaves on filiform stolons rooting among grass- and other plant-roots, and provided with small bladders.

8. UTRICULARIA SQUAMOSA, Wt. Ic. t. 1579. *U. caerulea* var. *squamosa*, C. B. Clarke; F. B. I. iv. 331.

Nilgiri Hills, about Sispara at 5,000 ft.; Attapadi Hills of Malabar at 5,300 ft. (Fischer).

A very slender erect plant with blue flowers and linear-spathulate leaves, very evanescent.

9. UTRICULARIA SMITHIANA, Wt. Ic. t. 1577. *U. caerulea* var. *Smithiana*, C. B. Clarke; F. B. I. iv. 331.

W. Ghâts, Malabar or Coorg (Wight); Pulneys, at high levels (Bourne).

A slender plant resembling *U. graminifolia* but much larger, also *U. reticulata* but less twining. Flowers blue shaded mauve and lilac, leaves linear-spathulate on filiform rhizomes bearing bladders.

10. UTRICULARIA RETICULATA, Smith Exot. Bot. t. 119; F. B. I. iv. 331; Wt. Ill. t. 143. *U. uliginosa*, Wt. Ic. t. 1574 (*right-hand fig. only*).

W. Coast, in all Districts, in rice-fields, climbing up the stems of the rice.

A striking and interesting species with blue-violet corolla, the palate reticulated with pale blue and white.

11. UTRICULARIA SCANDENS, Oliver; F. B. I. iv. 332.

Carnatic, Madras, Arcot (Shuter); Madura, near the hills (Wight); W. Ghâts up to 5,000 ft. in Anamalais (Barber).

A very minute twining plant, often found on other species like *U. Wallichiana*, the flowers blue.

12. UTRICULARIA BIFIDA, Linn.; F. B. I. iv. 332; Bot. Mag. t. 6689.

Deccan and Carnatic, Kambakam Hills of Chingleput (Bourne, etc.), hills of Cuddapah at 2,500 ft.; S. Travancore, in wet places (Bourdillon).

An erect rigid slender herb with yellow flowers, filiform leaves and 2-horned small bladders on threads at their bases.

13. UTRICULARIA WALLICHIANA, Wt. Ic. t. 1572, fig. 1; F. B. I. iv. 332.

Deccan, in hilly country in Salem and Coimbatore above 1,000 ft.; W. Ghâts, in all Districts up to 7,000 ft., in bogs and other wet places, common.

A very slender twining plant with yellow flowers and linear evanescent leaves.

Var. *macrolepis*, Gamble. *U. macrolepis*, Wt. Ic. t. 1580, fig. 2 *excl. seeds.*

Tinnevelly and S. Travancore (Wight).

Scales on the stem comparatively large, ovate, acute.

14. UTRICULARIA CAERULEA, Linn.; Wt. Ic. t. 1583. *U. racemosa*, Wall.; F. B. I. iv. 333. *U. nivea*, Vahl; Wt. Ic. t. 1582.

N. Circars, in Ganjam (Gamble); Deccan, Seshachalam Hills of Cuddapah, at 2,500 ft. (Gamble); W. Ghâts, Anamalais, Pulneys and hills of Travancore, up to 7,000 ft.; Shevaroy Hills of Salem; always in swampy places.

A very slender plant with flowers from white to purple, nearly sessile on the scape, the leaves short and spathulate with minute bladders. The very small form with few usually white flowers is var. *filicaulis*, C. B. Clarke.

15. UTRICULARIA ROSEO-PURPUREA, Stapf in Herb. Kew. *A. rosea*, C. B. Clarke; F. B. I. iv. 333, *not of* Edgw.

W. Ghâts, Anamalais, Pulneys and hills of Travancore, to 7,000 ft., in swamps.

A slender plant with dark purple (Trimen) or sometimes apparently pinkish flowers, rather large, the leaves rather short and spathulate.

16. UTRICULARIA STRIATULA, Sm. *U. orbiculata*, Wall.; F. B. I. iv. 334. *U. glochidiata*, Wt. Ic. t. 1581.

N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft. (Fischer); W. Ghâts, in almost all Districts from S. Canara and Mysore to Tinnevelly, above 3,000 ft., on wet rocks; Shevaroy Hills of Salem (Bourne).

A small very pretty slender herb with persistent leaves, filiform stolons bearing many small bladders, and flowers with the upper lip of the corolla white, the lower white with lilac margins and yellow in the throat.

Family CX. GESNERIACEAE.

Herbs or undershrubs, sometimes epiphytic. *Leaves* opposite alternate or solitary, entire or toothed; stipules 0. *Flowers* hermaphrodite, usually irregular, or axillary on terminal peduncles

rarely 1-flowered; bracts present; bracteoles usually small. *Calyx* of 5 lobes, valvate or open rarely imbricate. *Corolla* gamopetalous, tubular, more or less 2-labiate; lobes 5. *Stamens* on the corolla-tube, usually didynamous, sometimes 5, often only 2 perfect; anthers 2- or by confluence 1-celled, usually connate in pairs. *Disk* annular or cylindric or 0. *Ovary* 1- or imperfectly 2-celled; ovules numerous on bifid parietal sometimes subconfluent placentas; style linear; stigma capitate or 2-lobed. *Fruit* a 2-valved capsule or a berry; placentas parietal. *Seeds* very many, small, sometimes tipped with long hairs, sometimes with a longish funicle; testa usually reticulate; albumen scanty or 0; embryo straight.

Seeds tipped with one or more hairs from near the hilum, one from the apex; epiphytic undershrubs with fleshy or leathery leaves
1. **Aeschynanthus.**

Seeds not tipped with hairs :—
Fruit a loculicidal 2-valved capsule; placentas deeply intruded :—
Capsule linear, subfollicular; stamens 2 perfect..2. **Didymocarpus.**
Capsule ellipsoid or ovoid :—
Erect herbs with blue flowers and leaves with unequal bases :—
Stamens 4 perfect .....3. **Klugia.**
Stamens 2 perfect .....4. **Rhynchoglossum.**
Scapigerous herbs with 4 perfect stamens .....5. **Jerdonia.**
Fruit a capsule dehiscing circumscissly; succulent herb with flowers in heads.....6. **Epithema.**
Fruit a berry with large placentas; undershrub with small flowers and 4 perfect stamens .....7. **Isanthera.**

1. Aeschynanthus, Jack.

Epiphytic undershrubs, the stems often rooting at the nodes. *Leaves* opposite, fleshy or leathery, usually entire, the nerves obscure but sometimes apparent in dry specimens. *Flowers* often showy, in fascicles on terminal or axillary peduncles, rarely solitary; bracts usually small but sometimes large and coloured, deciduous; bracteoles small. *Calyx* 5-fid or 5-partite. *Corolla* tubular-ventricose, usually large and curved, the limb bilabiate, the upper lip of 2 small, the lower of 3 larger lobes. *Stamens* usually 4 perfect, with sometimes a rudimentary fifth, anthers 2 oblong, usually connate in pairs by their tips. *Disk* annular. *Ovary* superior, oblong or linear, stipitate; placentas naked on

the inner face, bearing ovules on the involute margin; stigma dilated. *Fruit* a long linear capsule, loculicidally 2-valved, the valves with placentas recurved at the margins. *Seeds* very many, small, oblong or linear, with 1 or more hairs at the end near the hilum and 1 at the apex; albumen 0; cotyledons very small.

Leaves linear-lanceolate, acuminate at apex, acute or somewhat rounded at base, up to 4·5 in. long, ·75 in. broad, the nerves, about 5–6 pairs (apparent when dry), very oblique; calyx-lobes linear, ·2–·3 in. long; corolla curved, glabrous without except the ciliate lobes, about 1·25 in. long ..... 1. *Perrottetii.*
Leaves elliptic or elliptic-lanceolate, acute, up to 2·5 or even 3 in. long, 1 in. broad, the nerves (when visible) about 5 pairs, spreading and not very oblique; calyx-lobes linear, ·5 in. long; corolla slightly curved, pubescent without, the lobes glandular-ciliate, 1·3–1·5 in. long ..... 2. *planiculmis.*

1. AESCHYNANTHUS PERROTTETII, A. DC.; F. B. I. iv. 339.
W. Ghâts, in all Districts, at 4,000–7,000 ft., on trees and rocks in moist forests.
An epiphyte with distant narrow leaves on smooth branches swollen at the nodes and there giving out rootlets. The flowers are handsome, scarlet with purple lines or spots on the lobes and the long papery capsules have seeds with one long hair at each end. *Ae. ceylanica* var. *pinguis*, C. B. Clarke, seems to be only a small form of this with thicker leaves.
2. AESCHYNANTHUS PLANICULMIS, Gamble n. comb. *Aeschynanthus Perrottetii*, A. DC., var. *planiculmis* (by error *platyculmis*), C. B. Clarke; F. B. I. iv. 340. *Ae. ceylanica*, Wt. Ic. t. 1347, *not of* Gardn.
W. Ghâts, hills of Tinnevelly above 4,000 ft., in damp forests.
An epiphyte with thick flattened stems and close rather broad fleshy leaves, the nodes giving out rootlets. The handsome flowers, larger than those of the former species, are also, apparently, scarlet and spotted, and the capsules and seeds are similar. It is doubtfully distinct.

2. Didymocarpus, Wall.

Herbs, rarely undershrubs, erect scapigerous or creeping. *Leaves* opposite alternate or crowded, rarely solitary. *Flowers*

axillary, fasciculed or pedunculate, cymose subumbellate or racemose with the pedicels in pairs; bracts small. *Calyx* small. 5-fid or 5-partite, the lobes narrow. *Corolla* tubular or campanulate, often ventricose, the mouth often oblique; lobes 5, rounded. *Stamens* included, the 2 anterior perfect, the anthers connate in pairs, the posterior 2 or 3 reduced to staminodes, rarely 4 perfect. *Disk* cylindric or 0. *Ovary* narrow, 1-celled, sessile or stipitate; placentas intruded and then recurved bearing the numerous ovules; style long or short; stigma peltate, emarginate or subcapitate, rarely 2-lobed. *Fruit* a linear rarely lanceolate capsule loculicidally 2-valved or follicular, bearing seeds on the back of the placenta lobes. *Seeds* very many, minute, ellipsoid or subtrigonous, the testa pitted or waved or reticulate.

Very small herb with short stem and only one very thin leaf, ovate-cordate, obtuse, entire, sessile, pilose, the nerves 8–9 pairs chiefly from near the base and prominently arching upwards; flower-pedicels few, fascicled in the leaf-axils; calyx-lobes linear, ·1–·2 in. long; corolla tubular-funnel-shaped, ·3 in. long; capsule ·5–·7 in. long, pilose ..... 1. *pygmaea.*

Trailing silvery-pilose herb with stems rooting at intervals, the nodes bearing each one long-petioled orbicular cordate leaf and a rather longer peduncle with a few flowers; the leaf up to about 4 in. in diam. and doubly crenate, the nerves about 6–7 pairs chiefly from the base and arching upwards; calyx-lobes linear, ·2 in. long; corolla tubular, curved upwards, ·5–·75 in. long; capsule slender, 1 in. long, pubescent 2. *repens.*

Scapigerous herbs, the leaves in a basal rosette :—

All the leaves with simple petioles not winged or broadened :—

Leaves entire, membranous, ovate, subacute, rounded at base, white-pellucid hairy, up to 4 in. long, 2 in. broad, nerves obscure, about 5 pairs, petiole up to 4 in. long; scapes 8–12 in. long, slender, with many flowers in racemes; calyx-lobes linear, ·2 in. long; corolla funnel-shaped, ·7–1 in. long; capsule slender, 1–1·25 in. long, glabrous ..... 3. *missionis.*

Leaves regularly shallowly crenate-serrate, elliptic-ovate, obtuse, white-strigose, up to 3 in. long, 2 in. broad, nerves prominent, 8–12 pairs, petiole up to 4 in. long; scapes up to 4 in., umbellately 2–6-flowered; calyx-lobes lanceolate, ·2 in. long; corolla tubular ventricose, ·75 in. long; capsule slender, 1 in. long, pubescent ..... 4. *ovalifolia.*

Older leaves with elongate petioles, winged and more or less lacerate, the younger and central leaves subsessile, more woolly :—

Petioles up to 6 in. long, inciso-pinnatifid, the blades membranous, ovate, lobulate, the lobes irregularly crenate, both surfaces softly villous, up to 3 in. long, 2 in. broad, nerves about 5 pairs, much branched; scapes slender, subcorymbose, many-flowered, up to 6 in. long, softly villous; corolla small, tubular-ventricose; capsule ·5 in. long, erect, pubescent .....5. *lyrata.*

Petioles up to 5 in. long, narrowly winged, the wings scarcely lacerate, the blades membranous, ovate, obtuse at apex, narrowed at base, prominently crenate, up to 4 in. long, 2·5 in. broad, nerves 5–7 pairs, prominent beneath and branched; scapes slender, up to 10 in. long in fruit; corolla ventricose, ·75 in. long; capsule up to 1·5 in. long, oblique, glabrous..6. *Meeboldii.*

Petioles up to 2 in. long, narrowly winged, the blades ovate, obtuse at apex, rounded or subcordate at base, crenate, up to 3 in. long, 2 in. broad, nerves 4–6 pairs; scapes slender, up to 7 in. long; corolla tubular-ventricose, about ·5 in. long; capsule up to 1·5 in. long, oblique, pubescent.....7. *Humboldtiana.*

Older leaves with short petioles, broadened or winged, not lacerate, the younger and central leaves sessile or nearly so :—

Crenatures of the leaves broad and deep, irregular, leaves rather thin, spathulate, the blade broadly decurrent on the petiole, bullate and with tufts of white hair, up to 6 in. long, 2·5–3 in. broad :—

Scape-peduncles about 4 in. long, slender, dichotomously branching several times to lax corymbs about 4 in. in diam.; corolla small, oblique at the mouth, ·3–·4 in. long; capsule slender, ·5–·8 in. long, very acuminate, villous..8. *Rottleriana.*

Scape-peduncles up to 10 in. long, stout, once dichotomously branching in few-flowered racemes elongating in fruit; corolla broadly campanulate and slightly ventricose, wide at the mouth, ·5 in. long; capsule stout, shortly acute, up to 1·25 in. long, slightly villous.....9. *Fischeri.*

Crenatures of the leaves shallow; leaves thick, the blade ovate or orbicular, broadly decurrent on the short petiole, bullate and thickly tufted with white silky hair, rarely over 3 in. long :—

Petiole about ·25 in. broad; crenatures irregular; scapes many stout, the peduncles up to 6 in. long, dichotomously branching in corymbs up to 2 in. in diam.; corolla campanulate, curved, the mouth wide, ·5 in. long; capsule 1 in. long, villous

10. *tomentosa.*

Petiole up to ·75 in. broad; crenatures regular; scapes few, the peduncles up to 7 in. long, branching in elongate racemes; corolla up to ·4 in. long, campanulate, the mouth very oblique; capsule ·75–1 in. long, thickly crispate villous..11. *lanuginosa.*

Crenatures scarcely any; leaves thick, densely white woolly, obovate-spathulate, up to 2 in. long; scapes under 4 in. long, ending in few-flowered drooping cymes; corolla small, curved, wide at the mouth, scarcely ·25 in. long; capsule lanceolate-acuminate, ·4 in. long .....12. *Wightii.*

1. DIDYMOCARPUS PYGMAEA, C. B. Clarke; F. B. I. iv. 345.
N. Circars, Rampa Hills (V. Narainswami) and Bison Hills (Barber) in Godavari, in crevices of rocks in damp places, usually above 2,000 ft.
A very delicate hyaline-pilose little plant with only one leaf, sessile on a short weak stem up to 3 in. long and up to about 2·5 in. long, 2 in. broad, the corolla apparently pinkish, the seeds somewhat trigonous, the sides with about 5 transverse depressions.
2. DIDYMOCARPUS REPENS, Bedd. Ic. t. 120; F. B. I. iv. 354.
W. Ghâts, hills of Tinnevelly and Travancore, in moist forests at 1,000–3,000 ft. (Beddome, Bourdillon, Barber).
A creeping herb with blue flowers rather wide at the mouth, and dilated filaments, the seeds somewhat trigonous, minutely reticulate.
3. DIDYMOCARPUS MISSIONIS, Wall.; F.B.I. iv. 354. *D. membranacea*, Bedd. Ic. t. 176.
W. Ghâts, Pachemalai Hills of S. Travancore at 2,000 ft., on moist rocks, rare (Beddome).
A delicate scapigerous stellately white-hairy herb, the flowers pale blue, the seeds angular, scurfy.
4. DIDYMOCARPUS OVALIFOLIA, Wt. Ic. t. 1351; F. B. I. iv. 354.
W. Ghâts, hills of Tinnevelly, about 3,000 ft.
A pretty species with large prominently ventricose flowers, said to be "blue-yellow" (Wt.), probably blue with a yellow throat, the seeds ellipsoid, flattened on one side, minutely scaly.
5. DIDYMOCARPUS LYRATA, Wt. Ic. t. 1350; F. B. I. iv. 353.
Tinnevelly Hills, about Courtallum, in moist shady places (Wight).

A softly villous herb with lyrate leaves and small flowers, the seeds oblong, minutely reticulate.

6. DIDYMOCARPUS MEEBOLDII, Sm. & Ramas. in Rec. Bot. Surv. Ind. vi. 43.
W. Ghâts, hills of Madura and Travancore, about 3,000 ft., at Peermade Ghât (Meebold).
A scapigerous herb with thin leaves, the older white-pilose especially on the nerves, the younger softly rusty-villous, the flowers (probably) pale blue with yellow tube, the seeds subtrigonous minutely pitted.

7. DIDYMOCARPUS HUMBOLDTIANA, Gardn.; F. B. I. iv. 353.
W. Ghâts, Nilgiris, near Coonoor (Bourne, Gamble) and Pulneys (Bourne) at about 6,000 ft., on rocks.
A scapigerous herb with pale lilac flowers.

8. DIDYMOCARPUS ROTTLERIANA, Wall.; F. B. I. iv. 353.
W. Ghâts, hills of Tinnevelly and Travancore, at 2,000–3,000 ft.
A large scapigerous herb with many scapes and purple flowers, yellow in the throat, the seeds boat-shaped, rough.

9. DIDYMOCARPUS FISCHERI, Gamble in Kew Bull. 1923, 117.
W. Ghâts, Anamalai Hills at 1,700 ft. (Fischer).
A large and handsome species.

10. DIDYMOCARPUS TOMENTOSA, Wt. Ic. t. 1349; F. B. I. iv. 353.
Deccan, Veligonda Hills of Nellore (Ramaswami), hills of N. Coimbatore at 4,000 ft. (Fischer); Carnatic, Kollimalai Hills of Trichinopoly (Barber); W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Madura and Tinnevelly, 3,000–6,000 ft., on rocks.
A scapigerous herb with bluish-purple flowers, the seeds subtrigonous, pitted minutely.

11. DIDYMOCARPUS LANUGINOSA, Wt., *not of* Wall. *D. tomentosa* var. *lanuginosa*, C. B. Clarke; F. B. I. iv. 353.
W. Ghâts, hills of Madura and Tinnevelly (Wight).
A scapigerous herb with thick cinnamomeous-tomentose leaves.

12. DIDYMOCARPUS WIGHTII, Gamble n. comb. *D. Rottleriana* var. *Wightii*, C. B. Clarke; F. B. I. iv. 353. *D. Rottleriana*, Wt. Ic. t. 1348, *not of* Wall.
Sivagiri Hills of Tinnevelly (Wight), apparently very rare.
A small plant with very white woolly leaves.

3. Klugia, Schlect.

Herbs, the stems rooting near the base, then erect, somewhat succulent. *Leaves* alternate, unequal-sided at base, the lower side cordate, subentire or sinuate, many-nerved. *Flowers* in terminal or leaf-opposed many-flowered racemes; bracts minute or 0; bracteoles very small, linear. *Calyx* campanulate, 5-angled or -winged, one wing often large; lobes 5. *Corolla*-tube cylindric, limb 2-lipped, the upper very small, the lower broad, rounded or shortly 3-lobed, with 2 hooded depressions at base. *Stamens* 4 perfect, included, inserted above the middle of the tube; anthers 2-celled, approximate in pairs. *Disk* fleshy, annular or cylindric. *Ovary* ovoid, many-ovuled; style slender; stigma obscurely 2-lobed. *Fruit* a loculicidal 2-valved ovoid capsule, the placentas divided into 2 thick plates, bearing seeds all over. *Seeds* ellipsoid, minute, testa reticulate.

KLUGIA NOTONIANA, A.DC.; F. B. I. iv. 366; Wt. Ic. t. 1353.
W. Ghâts, all Districts, above 3,000 ft., in damp places in evergreen forests.
A nearly succulent annual herb reaching 2 ft. in height, with rather large flowers, white in the tube, the large lower lip bright blue with yellow near the cavities at the base; leaves very unequal-sided with many prominent parallel curved nerves, up to 8 in. or more long, 4 in. broad, glabrous or scabrid-pubescent.

4. Rhyncoglossum, Blume.

Herbs, usually glabrous. *Leaves* alternate, unequal-sided at base, the lower side cordate, entire or sinuate. *Flowers* in long many-flowered racemes; bracts 0; bracteoles minute. *Calyx* campanulate, 5-lobed. *Corolla*-tube cylindric, contracted at the mouth; limb 2-lipped, the upper short bifid, the lower longer, 3-lobed. *Stamens* 2 perfect included, the anthers 2-celled connivent; the others reduced to staminodes. *Disk* shortly cylindric. *Ovary* ovoid, glabrous, 1-celled; placentas intruded, of 2 thick plates bearing numerous ovules on all sides; style linear; stigma minutely 2-lobed. *Fruit* a membranous loculicidal 2-valved capsule. *Seeds* minute, ellipsoid; testa reticulate.

RHYNCOGLOSSUM OBLIQUUM, Bl.; F. B. I. iv. 367. Var. *parviflora*, C. B. Clarke.

N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft. (Fischer); W. Coast and W. Ghâts from S. Canara to Cochin, up to 3,000 ft., in damp places in evergreen forests.

A succulent herb with blue flowers, similar to *Klugia Notoniana* but usually smaller and with the calyx not winged. Leaves oblong lanceolate acuminate, parallel-nerved, very unequal at base.

5. Jerdonia, Wight.

A scapigerous herb, from a thick scarred root-stock. *Leaves* crowded at the base, elliptic, reticulate, long-petioled. *Flowers* in slender few-flowered scapes; bracts small. *Calyx* 5-partite, the lobes lanceolate, long-pilose. *Corolla*-tube elongate, swollen upwards; limb oblique, 2-lipped, upper lip emarginate, lower 3-lobed. *Stamens* 4 perfect; filaments dilated, the lower pair with a descending spur; anthers 2-celled, cohering at their apices. *Disk* cup-shaped. *Ovary* ovoid; placentas 2, each of 2 flat plates bearing ovules on both faces; style linear; stigma peltate. *Fruit* an ovoid, loculicidal, 2-valved villous capsule with 4 many-seeded placentas. *Seeds* funicled, ellipsoid, grooved at the sides.

JERDONIA INDICA, Wt. Ic. t. 1352; F. B. I. iv. 368.

W. Ghâts, Nilgiri and Anamalai Hills, at about 3,000 ft., in damp evergreen forests; Bolampatti Hills of Coimbatore.

A scapigerous herb with pale lilac corolla marked with red lines, and long petioled rusty-villous leaves up to 2·5 in. long, 2 in. broad, with about 5 pairs of arching nerves and prominent reticulation.

6. Epithema, Blume.

Small succulent pubescent herbs; stem simple or branched. *Leaves* few, alternate or opposite. *Flowers* small, in dense pedunculate scorpioid cymes; bract large, solitary, hooded or subspathaceous; bracteoles small, narrow; pedicels very short. *Calyx* campanulate; lobes 5, acute, valvate in bud. *Corolla* small, tubular, 2-lipped, lobes 5, subequal. *Stamens* 4, 2 upper perfect, the anthers 2-celled, cohering, the cells short, soon confluent; 2 lower reduced to staminodes. *Disk* one-sided. *Ovary* ovoid, 1-celled; placentas parietal, stalked, peltate, with ovules on all sides; style filiform; stigma small. *Fruit* a

globose membranous capsule included in the calyx and dehiscing circumcissly; placentas T-shaped. *Seeds* very numerous, on slender funicles, oblong, acute at both ends; testa usually spirally striate.

EPITHEMA CARNOSUM, Benth.; F. B. I. iv. 369. Var. *hispida*, C. B. Clarke. *E. ceylanicum*, Wt. Ic. t. 1354, *not of* Gardn.

W. Ghâts, Nilgiris to Tinnevelly Hills, on shaded rocks, at low levels.

A small herb with bluish flowers and leaves of variable size sometimes up to 5 in. in diam. and broadly ovate cordate.

7. Isanthera, Nees.

Small undershrubs; almost all parts tawny-silkily woolly. *Leaves* alternate, large, oblanceolate, long-petioled. *Flowers* in axillary peduncled cymes towards the end of the stem; bracts narrow. *Calyx* of 5 narrow lobes extending nearly to the base. *Corolla* small, shortly campanulate, scarcely 2-lipped; lobes 5, ovate. *Stamens* 4 perfect, adnate to the base of the corolla; filaments short; anthers 1-celled, dehiscing marginally, in an arch; staminodes usually absent. *Disk* small, annular. *Ovary* ovoid; placentas 2, recurved and bearing many ovules; style short; stigma small, capitate. *Fruit* an ovoid fleshy indehiscent berry; placentas large, the margin recurved vertically. *Seeds* very small, ellipsoid; testa smooth or slightly wrinkled.

ISANTHERA PERMOLLIS, Nees; F. B. I. iv. 372; Wt. Ic. t. 1355.

W. Ghâts, S. E. Wynaad and Malabar slopes at 2,000–3,000 ft.; hills of Tinnevelly, in moist places in evergreen forests.

An erect undershrub with smooth pale brown bark under soft tawny wool, small white flowers and large softly tawny-villous leaves up to 10 in. long, 4 in. broad, long decurrent on a long petiole, the conspicuous parallel nerves about 20 pairs.

Family CXI. BIGNONIACEAE.

Trees or shrubs, sometimes climbing, rarely herbs. *Leaves* opposite, rarely alternate or whorled, 1–3 times odd-pinnate, very rarely simple; leaflets entire or sometimes toothed. *Flowers*

hermaphrodite, irregular, in racemes or panicles usually terminal, often large and showy; bracts various. *Calyx* gamosepalous, campanulate or spathaceous; lobes 2–5 or 0, valvate. *Corolla* 2-lipped, tubular-ventricose; lobes 5, subequal, imbricate in bud. *Stamens* 4, didynamous, with often a 5th usually imperfect, rarely perfect; inserted where the corolla-tube is suddenly swollen; filaments glabrous or hairy at base; anthers 2-celled, the cells parallel or divergent, dehiscing longitudinally. *Disk* usually thick or annular. *Ovary* subsessile, 2-celled; ovules numerous, in many rows, anatropous; style long, glabrous; stigma of 2 elliptic lobes. *Fruit* a usually elongate loculicidally or septicidally 2-valved capsule, the septum enlarging, deciduous with the placentas. *Seeds* compressed, discoid or trigonous, usually prominently winged, the embryo in an interior membranous testa; albumen 0; cotyledons flattened, sometimes folded.

Perfect stamens 5; a tree with 2–3-pinnate leaves and very large flat capsules ..... 1. **Oroxylum.**
Perfect stamens 4; trees:—
Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2–3-pinnate leaves and very long linear corolla-tube .. 2. **Millingtonia.**
Anther-cells 2, both perfect:—
Capsule not winged, cylindric flattened or subquadrangular:—
Calyx spathaceous, split on one side; corolla-tube slender, lobes spreading, crisped on the margins .... 3. **Dolichandrone.**
Calyx not spathaceous; corolla-tube ventricose:—
Capsule with a flat or angular septum .... 4. **Heterophragma.**
Capsule with a cylindric spongy septum:—
Septum prominently pitted, the seeds trigonous, transversely grooved without, the inner edge fitting into the pit; ovules 2-seriate in each cell ..... 5. **Stereospermum.**
Septum only faintly pitted, the seeds flat; ovules many-seriate in each cell ..... 6. **Radermachera.**
Capsule winged on both margins, the septum flat; a large tree with large flowers and large pinnate leaves ..... 7. **Pajanelia.**

1. **Oroxylum,** Vent.

A glabrous tree. *Leaves* large, opposite, 2–3-pinnate; leaflets entire. *Flowers* large, in long terminal racemes. *Calyx* large, leathery, campanulate, the limb truncate or obscurely toothed. *Corolla* large, fleshy, campanulate; lobes 5, subequal, crisped.

Stamens 5 perfect, the posterior one the shortest; filaments inserted near the base of the tube; anthers 2-celled, the cells parallel, oblong. *Disk* large, cushion-like. *Ovary* subsessile, contracted at the base, compressed; ovules very many; style slender; stigma 2-lobed. *Fruit* a very large broadly linear septifragally 2-valved capsule, compressed parallel to the septum. *Seeds* very many, flattened, surrounded by a broad hyaline papery wing; cotyledons emarginate.

OROXYLUM INDICUM, Vent.: F. B. I. iv. 378. *Calosanthes indica*, Bl.; Wt. Ic. t. 1337.

Most Forest Districts, chiefly in moist places in deciduous forest; in evergreen forests in Travancore (Bourdillon) up to 2,000 ft.

A small conspicuous but ungainly tree, at once known by the 2–3-pinnate large leaves and the flat capsule, which may reach 3 ft. in length. Bark light brownish-grey, greenish when cut; wood yellowish-white, soft, not used. Vern. *Hind.* Ullu, Sauna; *Ur.* Pomponia; *Tel.* Pampini, Pampana; *Tam.* Achi, Pana, Pei; *Mal.* Palaga-paiyani; *Kan.* Bunepalé.

2. Millingtonia, Linn. f.

A tall tree with corky bark. *Leaves* opposite, 2–3-pinnate, the leaflets entire or crenate. *Flowers* in terminal corymbose panicles. *Calyx* small, campanulate, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, subequal. *Stamens* 4, didynamous, shortly exsert; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular. *Ovary* subsessile, cylindric-conical; ovules many 1- or more-seriate; style slender; stigma 2-lobed. *Fruit* an elongate linear capsule compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, with a broad hyaline wing.

MILLINGTONIA HORTENSIS, Linn. f.; F. B. I. iv. 377; Bedd. Fl. t. 249 (except anthers). *Bignonia suberosa*, Roxb. Cor. Pl. t. 214.

Plains Districts, planted in avenues and gardens and often found run wild. It is said to have come from Burma. Indian Cork Tree.

A tall handsome tree with sweet-scented flowers. Bark

thick corky; wood soft, yellowish-white, likely to be useful as a "deal." The tree reproduces well both by seed and by suckers. Vern. *Hind.* Akao-nim; *Tam.* Kat malli; *Tel.* Kavuki.

3. Dolichandrone, Fenzl.

Trees. *Leaves* opposite, pinnate, the leaflets entire or obscurely toothed. *Flowers* few, opening at night, usually white, large or moderate-sized, in terminal corymbs or panicles. *Calyx* spathaceous, cleft to the base on one side. *Corolla*-tube long or short; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; anthers glabrous, the cells parallel. *Disk* annular. *Ovary* sessile; ovules numerous, many-seriate; style long; stigma 2-lobed. *Fruit* a long subterete or compressed capsule, loculicidally 2-valved; the septum narrow with a transverse false septum, making seemingly 4 cells. *Seeds* much compressed, almost rectangular, with broad wings on each side; cotyledons usually broader than long, emarginate.

Corolla 4–7 in. long, the tube long and slender below, widening after half-way in a funnel, the lobes spreading up to a 4 in. broad mouth; calyx spathe abruptly acuminate at apex; leaves with 5–9 acuminate rhomboid leaflets up to 4 in. long, unequal at base; capsule straight, up to 18 in. long, 1 in. broad, the seeds with corky wings ..... 1. *spathacea.*

Corolla under 3 in. long, the tube slender below slightly widening, the mouth about 2 in. in diam.; seeds with membranous wings:—

Corolla more than 1·5 in. long, usually 2 in.; calyx-spathe with a recurved point; capsule arcuate with conspicuous speckles, only slightly compressed, 12 in. or more long:—

Glabrous or nearly so, leaflets usually 5 rarely 7, ovate, acuminate, nerves about 5–7 pairs, petiolules ·3–·6 in. long, that of end-leaflet longer ..... 2. *atrovirens.*

Pubescent or subfloccose, leaflets usually 5 or 7, sometimes up to 11, ovate or orbicular, obtuse or with a short point, nerves about 5–6 pairs, petiolules ·1–·3 in. long, that of end leaflet longer ..... 3. *arcuata.*

Corolla less than 1·5 in. long, calyx-spathe obtuse or emarginate; capsule falcately curved, much flattened, without speckles but minutely striate, up to about 21 in. long, ·75 in. broad; leaflets usually 7, orbicular obovate or even obcordate, with a small point.

except in var. *Lawii*, grey-pubescent, up to 1·5 in. in diam. but usually much smaller.....4. *falcata.*

1. DOLICHANDRONE SPATHACEA, K. Schum.; Sprague in Kew Bull. 1919, 304. *D. Rheedii*, Seem.; F. B. I. iv. 379. *Spathodea Rheedii*, Wall.; Wt. Ic. t. 1339.

   W. Coast, S. Canara to Travancore, on the banks of rivers and backwaters.

   A moderate-sized deciduous tree with beautiful white flowers which are open at night and then fall off. Wood white, soft. Vern. *Tam.* Vilpadri; *Mal.* Nir pongilium.

2. DOLICHANDRONE ATROVIRENS, Sprague in Kew Bull. 1919, 304. *D. crispa*, Seem.; F. B. I. iv. 379.

   Deccan, in the Ceded Districts, eastwards to the hills of Nellore, south to Tinnevelly and S. Travancore, in dry deciduous forests, up to 3,000 ft.

   A moderate-sized tree with pretty white flowers. Bark brown, rough; wood yellowish-brown, useful. Vern. *Tel.* Nironddi; *Tam.* Pumbadri.

3. DOLICHANDRONE ARCUATA, C. B. Clarke; F. B. I. iv. 380. *Spathodea arcuata*, Wt. Ic. t. 1340.

   Deccan, in Kurnool, Mysore and Coimbatore, in dry deciduous forest, west to Palghát.

   A moderate-sized tree, with flowers rather larger than in the last. Bark brown, peeling off in flakes; wood white. Vern. *Tam.* Ran palai.

4. DOLICHANDRONE FALCATA, Seem.; F. B. I. iv. 380. *Bignonia spathacea*. Roxb. Cor. Pl. t. 144. *Spathodea falcata*, Wall.; Bedd. Fl. t. 71.

   N. Circars, in Vizagapatam and Upper Godavari; Deccan, in Hyderabad, Mysore, and all other Districts; Carnatic, Nellore to S. Arcot. Shevaroy Hills, Sirumalai Hills in Madura, in dry deciduous forests, often on rocky slopes.

   A small deciduous tree with white flowers. Bark bluish grey, exfoliating in scales; wood white, hard and close-grained, useful. Vern. *Tel.* Udda, Wodi, Chittivadi; *Tam.* Kaṭuvarsana; *Kan.* Wudige.

Var. *Lawii*, Sprague in Kew Bull. 1919, 308. Nearly or quite glabrous, the leaflets more ovate, with a short point and not emarginate, the nerves 5 pairs.

Dry forest lands in Cuddapah (Gamble).

4. Heterophragma, DC.

Trees. *Leaves* large, pinnate. *Flowers* large, in terminal woolly panicles. *Calyx* ovoid and closed when young, afterwards campanulate, irregularly 3–5-lobed. *Corolla* tubular-ventricose, rose white or yellow, glabrous or tomentose without; lobes 5, rounded, subequal. *Stamens* 4, didynamous, included; anthers glabrous, the cells linear-oblong, diverging. *Disk* cushion-shaped. *Ovary* sessile; ovules numerous, many-seriate on each placenta; style long; stigma 2-lobed. *Fruit* an elongate cylindric or more or less compressed, falcate or twisted, loculicidally 2-valved, capsule, the dissepiment flat or 4-angular. *Seeds* compressed, with a membranous wing at each end.

HETEROPHRAGMA ROXBURGHII, DC.; F. B. I. iv. 381. *Bignonia quadrilocularis*, Roxb. Cor. Pl. t. 145.

N. Circars, forests of the Godavari banks at low levels; W. Ghâts, hills of S. Canara, in deciduous forest areas.

A large tree with fragrant rose-coloured flowers, densely tomentose calyx, imparipinnate leaves with 7–11 leaflets and narrowly oblong capsules up to 1 ft. long. Wood yellowish-white, hard. Vern. *Tel.* Bondgu; *Tam.* Baro-kala-goru.

H. adenophyllum, Seem., is a Burmese species with large brownish-yellow flowers frequently found in gardens in cultivation.

5. Stereospermum, Cham.

Trees. *Leaves* opposite, imparipinnate; leaflets entire or toothed. *Flowers* in large lax terminal panicles. *Calyx* campanulate, truncate or shortly and unequally 5-lobed. *Corolla* tubular-campanulate, curved, 2-lipped, the upper lip 2- the lower 3-lobed; lobes nearly equal, rounded crisped toothed or laciniate. *Stamens* 4 didynamous with a 5th rudimentary, included; anthers glabrous, the cells divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, biseriate in each cell; style slender; stigmas 2. *Disk* cupular, fleshy. *Fruit* an elongate terete or 4-angled capsule, loculicidally 2-valved; septum thick, corky, cylindrical, pitted in alternating cavities to receive the seeds, the wings of which lie flat along it. *Seeds* trigonous, with a transverse groove without and a prominent ridge within; cotyledons folded, 2-lobed; radicle straight.

ilaments of the stamens with a tuft of woolly hair at the base; leaves nd panicles nearly or quite glabrous, the leaflets elliptic, suddenly nd long caudate-acuminate at apex; capsule slender, somewhat pirally twisted, 4-angled ..... 1. *tetragonum.*
ilaments of the stamens without a tuft of woolly hair at the base lough sometimes villous; leaves and panicles more or less pubesent :—

Petiolules of leaflets very short, scarcely ·1 in. long, leaflets broadly elliptic, shortly abruptly acuminate, often serrulate when young, rough; capsule rather stout, nearly terete, lenticellate, usually straight ..... 2. *suaveolens.*
Petiolules of leaflets longer, up to ·4 in. long, leaflets oblong or oblong-lanceolate, acuminate, pubescent beneath even when old; capsule slender, terete, lenticellate, often curved 3. *angustifolium.*

1. STEREOSPERMUM TETRAGONUM, DC. *S. chelonoides*, C. B. Clarke, F. B. I. iv. 382; Wt. Ic t. 1341; Bedd. Fl. t. 72, *not of* DC.

   Deccan, Nallamalai Hills, Veligonda Hills of Nellore (Ramaswami); W. Ghâts, in all Districts, up to about 3,000 ft., chiefly in deciduous forests.

   A large tree with yellow flowers veined with red, the capsules up to 2 ft. long. Bark brown; wood hard, greyish brown with darker patches, very little used in S. India. Vern. *Hind.* Padri; *Ur.* Patuli; *Tel.* Pisul, Tagada; *Tam.* Vela-padri, Pombathiri; *Mal.* Karingkura.

2. STEREOSPERMUM SUAVEOLENS, DC.; F. B. I. iv. 382; Wt. Ic. t. 1342.

   N. Circars and Deccan, in deciduous forests; W. Ghâts, also in deciduous forests, in the hills of Mysore, Malabar and Travancore, scarce.

   A large tree with dull crimson flowers, and rather thick straight capsules up to 18 in. long. Bark grey, exfoliating in flat scales; wood hard, yellowish-brown, useful for many purposes but little used. Vern. *Hind.* Padal; *Tam.* Padri; *Tel.* Kala goru; *Mar.* Parúl; *Kan.* Billa.

3. STEREOSPERMUM ANGUSTIFOLIUM, Haines in Kew Bull. 1922, 121.

   N. Circars, near Vizagapatam (Barber); Deccan, Hyderabad Forests (Edwards).

   A small tree.

6. Radermachera, Zoll. & Moritz.

Trees. *Leaves* opposite, 1–3-pinnate, leaflets petiolulate, entire *Flowers* large, in terminal racemes, corymbs or panicles. *Calyx* campanulate, truncate or shortly lobed. *Corolla* funnel-shaped or campanulate: tube short; limb sub-bilabiate, the lobes spreading, rounded. *Stamens* 4, didynamous, with a rudimentary fifth, included; filaments slender; anther-cells divaricate. *Ovary* cylindrical, 2-celled; ovules very numerous, in many rows in each cell; style slender; stigma linguiform. *Fruit* an elongate, often twisted capsule; valves 2, woody; septum spongy, faintly pitted and bearing on each side a double row of seeds. *Seeds* small, flat, with a membranous wing at each end; cotyledons flat, not folded; internal testa thin; radicle minute.

RADERMACHERA XYLOCARPA, K. Schum. *Stereospermum xylocarpum*, Benth. & Hook. f.; F. B. I. iv. 383. *Bignonia xylocarpa*, Roxb., Wt. Ic. tt. 1335, 6, Bedd. Fl. t. 70. *Spathodea xylocarpa*, Brand. For. Fl. t. 43.

N. Circars, hills of Godavari; Deccan, hilly country as at Horsley-konda, Ramandrúg, etc., up to 4,000 ft.; W. Ghâts, dry forests in all Districts.

A large deciduous tree with large bipinnate leaves, fragrant flowers in corymbs, a white corolla tinged with yellow or pink, and a long very woody cylindric prominently tubercular capsule sometimes up to 3 ft. long and 1·5 in. in diam. Bark light grey; wood very hard, orange-brown, tough, used for furniture, cart-poles and other purposes. Vern. *Tam.* Vadencarni, Pathiri; *Mar.* Khansing; *Mal.* Vedangkonnai.

7. Pajanelia, DC.

A tree. *Leaves* imparipinnate; leaflets numerous, entire, unequal at base. *Flowers* large, in large terminal thyrsoid panicles. *Calyx* large, ovoid, closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla* large, tubular-ventricose; lobes 5, subequal, crisped on the margins. *Stamens* 4, didynamous, with a rudimentary fifth, sub-exsert; filaments slender; anther-cells linear, divergent. *Disk* annular. *Ovary* 2-celled; ovules many-seriate on each placenta; style long; stigma 2-lobed. *Fruit* a large, narrowly oblong, compressed, winged capsule,

loculicidally 2-valved, the septum contrary to the valves. *Seeds* compressed, with hyaline wings; cotyledons emarginate.

PAJANELIA RHEEDII, Wt. Ic. tt. 1343, 44; F. B. I. iv. 384.

W. Coast, S. Canara to Travancore, up to 2,000 ft. in the W. Ghâts forests (Beddome); much planted as a support for the pepper plant (Bourdillon).

A large deciduous tree in the forests, moderate-sized in plantations, having leaves with 13–15 large leaflets, a large capsule sometimes nearly 2 ft. long with broad wings and corollas 2·5 in. long, white in the tube, crimson-purple on the lobes (Bourd. Trees Trav. 278). Bark pale grey, shining, rough; wood sometimes used for dugout canoes in Travancore. Vern. *Tam.* Aranthal; *Mal.* Arlantha, Payani.

Several interesting species of this Family, trees or erect or climbing shrubs, have been introduced and cultivated. The most common of these are:

Markhamia stipulata, Seem. (*Dolichandrone stipulata*, Benth. and Hook. f.; F. B. I. iv. 379), a tree from Burma, with yellowish-brown tomentose leaves and inflorescence, the corolla purple inside.

Spathodea campanulata, Beauv., a tree, introduced from Tropical Africa, with large orange-scarlet flowers, the calyx spathaceous.

Kigelia pinnata, DC., a small tree, introduced from Tropical Africa, with pendulous racemes of large red flowers and a long-stalked large gourd-like fruit.

Stenolobium stans, D. Don, a large West Indian shrub with golden-yellow flowers, common in gardens.

Pyrostegia ignea, Presl, a large climbing shrub, native of Brazil, commonly cultivated in gardens, and conspicuous for its showy racemes of orange-red flowers.

Family CXII. PEDALIACEAE.

Herbs, rarely undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed; stipules 0. *Flowers* irregular, hermaphrodite, solitary or rarely clustered or racemose, usually axillary; bracts 0 or minute. *Calyx* usually deeply 4–5-lobed. *Corolla* tubular-ventricose; limb 5-lobed, obscurely 2-lipped; lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Disk* hypo-

gynous, fleshy. *Ovary* 2- rarely 1-celled, ovules many or few, superposed; style filiform; stigma 2-lobed. *Fruit* drupaceous or capsular. *Seeds* exalbuminous.

Flowers axillary; stamens 4, didynamous, perfect:—
Fruit indehiscent, with 4 spines on the margin; seeds 2 in each cell ..... 1. **Pedalium.**
Fruit capsular, 2-valved, not spinous; seeds many in each cell 2. **Sesamum.**
Flowers in racemes; stamens 2 only perfect; fruit drupaceous with dehiscent pericarp and hard 2-clawed endocarp ..... **Martynia.**

1. Pedalium, Linn.

A glabrous annual. *Leaves* opposite or alternate, repand-dentate. *Flowers* axillary, solitary, yellow; pedicels short, 2-glandular at the base. *Calyx* small, 5-partite. *Corolla*-tube slender below, enlarged above; limb sub-bilabiate; lobes 5, round, spreading. *Stamens* 4, didynamous, with a 5th rudimentary; anther-cells ovate, pendulous, opening by short slits. *Disk* large, oblique. *Ovary* 2-celled, ovules 2 in each cell; style slender; stigma 2-lobed, the lower the smaller. *Fruit* hard, indehiscent, 2-celled; the upper part ovoid obtuse above, tetragonous below with sharp conical spines at the angles. *Seeds* 2 in each cell, superposed, pendulous, oblong; testa membranous, produced; cotyledons oblong.

PEDALIUM MUREX, Linn.; F. B. I. iv. 386; Wt. Ic. t. 1615.
E. Coast from the Chilka Lake southwards, on sandy shores; inland in the Carnatic, Coimbatore (Wight, etc.), Trichinopoly (King).
A branching sub-fleshy herb with minute glands, badly smelling, the leaves glaucous green, ovate, repand, long-petioled, the fruits spinous. The whole plant is used in medicine, and renders water or milk mucilaginous. Vern. *Ur.* Gokara; *Tam.* Anai-nerinji.

2. Sesamum, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed lobed or divided. *Flowers* axillary solitary or few and fascicled, shortly pedicelled. *Calyx* small, 5-partite. *Corolla* tubular-ventricose, slightly gibbous at base, 2-lipped.

the upper lip usually the smaller, often a ring of hairs at the base inside below the stamens. *Stamens* 4, didynamous, included; anther-cells oblong, parallel. *Disk* annular. *Ovary* 2-celled, with false septa making it 4-celled when mature; ovules many, 1-seriate in each cell; style filiform; stigma 2-lobed. *Fruit* an oblong or ovoid capsule, loculicidally 2-valved, 4-chambered. *Seeds* many, obliquely oblong or obovate, sub-compressed; cotyledons elliptic-oblong.

Erect herbs; leaves large, thin, the lower ones lobed or pedatisect, sparsely hairy, the lobes often serrate, up to 5 in. long; corollas whitish-pink or purplish, with yellow marks, 1–1·25 in. long; capsule oblong, 1 in. long, dehiscent from above to about halfway down
1. *indicum.*

Prostrate branching herbs; capsule ovoid, ·5 in. or more long:—
Leaves variable, from elliptic or orbicular in outline and deeply pinnatifid to spathulate and coarsely lobed, 1–2 in. long, grey-hispid-pubescent; flowers 1–1·5 in. long; capsule ·6 in. long, ·3 in. broad, obtuse and apiculate .....2. *laciniatum.*
Leaves orbicular or obovate, crenate, densely white tomentose beneath, ·3 ·5 in. in diam.; flowers ·75–1 in. long; capsule ·5–·7 in. long, obtuse, broad at base, then contracted, apiculate
3. *prostratum.*

1. SESAMUM INDICUM, Linn.; F. B. I. iv. 387; Wt. Ill t. 163.
All districts, in the plains and lower hills, largely cultivated and often found run wild on road sides and waste land. Gingelly.
An erect annual up to 2 ft. high, branching from the base, the seeds obovate, smooth, margined, black or white. The seeds give a valuable oil, used for cooking, for lamps and for many other purposes and largely exported. Vern. *Hind.* Til; *Tel.* Nuvvulu; *Tam.* Yellu cheddi.

2. SESAMUM LACINIATUM, Klein; F. B. I. iv. 387; Wt. Ic. t. 1345.
Deccan, in Cuddapah and Kurnool; Carnatic, Kambakam Hill in Chingleput, usually on dry rocky ground.
A stout herb with many prostrate branching stems from a stout central rootstock, the flowers dark purple, the seeds black and deeply reticulate.

3. SESAMUM PROSTRATUM, Retz; F. B. I. iv. 387; Wt. Ic. t. 1346.

E. coast from the Kistna southwards, on sandhills near the sea; inland at Bangalore (Cleghorn) and near Coimbatore (Fischer) on dry sandy lands; Kambakam Hill in Chingleput (Bourne).

A prostrate herb with long trailing branches from a thick taproot, the flowers purple, the seeds black and reticulate.

Martynia annua, Linn., the Tiger-claw plant, is a coarse clammy pubescent herb with handsome large rose-coloured blotched flowers, large deltoid-ovate cordate leaves and a curious fruit with 2 sharp anterior hooks. It is common on roadsides, rubbish heaps and waste places. It is a native of Mexico.

Family CXIII. ACANTHACEAE.

Herbs or shrubs, rarely trees. *Leaves* opposite, usually entire, usually lineolate with prominent raphides; stipules 0. *Flowers* hermaphrodite, usually irregular, in cymes racemes or spikes rarely solitary; bracts large or small, sometimes 0; bracteoles usually 2. *Calyx* 5-, rarely 4-partite (in *Thunbergia* small, often multifid). *Corolla* 2-lipped or subequally 5-lobed; lobes imbricate or twisted in bud. *Stamens* 4 or 2, inserted on the corolla-tube, sometimes a staminode 5th; anthers 2- or 1-celled, the cells sometimes remote. *Disk* often conspicuous. *Ovary* superior, 2-celled; ovules 1 or more in each cell, in one or two series, anatropous; style simple; stigma usually 2-lobed, the lobes often unequal. *Fruit* a loculicidal capsule, the valves often elastically recurved, the septum splitting. *Seeds* usually hard, attached, except in a few genera, to upcurved supports (*retinacula*), ovoid or compressed, the testa smooth or rugose or clothed with appressed hairs which are often elastic and spread out when wetted; albumen none or rarely scanty; cotyledons usually flattened.

Seeds not supported on retinacula; leaves not lineolate :—

Climbers; flowers usually large; ovules 2 in each cell, collateral :—

Calyx minute, annular or 10–15-toothed ..... 1. **Thunbergia.**

Calyx 5-lobed ..... 2. **Meyenia.**

Erect or prostrate plants; flowers usually small; ovules more than 2 in each cell :—

Calyx 4-partite; stamens 2 :—

Bracts rigid; peduncle of spike covered with alternate scales 3. **Elytraria.**

Bracts herbaceous ; peduncle of spike without scales or 0
4. Nelsonia.

Calyx 5-partite ; stamens 4 .....**5. Staurogyne.**

Seeds supported on retinacula :—

Retinacula minute, straight ; lower leaves often toothed or pinnatifid.....**6. Cardanthera.**

Retinacula hooked :—

Corolla without an upper lip, the lower lip large, expanded, 3-lobed :—

Lower filaments with an excurrent process .....**7. Blepharis.**

Lower filaments without an excurrent process....**8. Acanthus.**

Corolla 2-lipped or with 5 subequal lobes :—

Corolla-lobes twisted to the left in bud :—

Ovules more than 2 in each cell ; the capsule normally 6- or more seeded :—

Corolla distinctly 2-lipped :—

Inflorescence spinous ; capsule 2–8-seeded
9. Asteracantha.

Inflorescence not spinous ; capsule 8- or more seeded
10. Hygrophila.

Corolla subequally 5-lobed :—

Capsule clavate with a solid base.....**11. Ruellia.**

Capsule seed-bearing from the base :—

Flowers capitate or axillary, subsessile
12. Hemigraphis.

Flowers in clusters in terminal panicles
13. Stenosiphonium.

Ovules 2 in each cell ; the capsule 4- or fewer-seeded :—

Placentas separating elastically from the base of the ripe capsule :—

Bracteoles very large, reticulate ; corolla large
14. Petalidium.

Bracteoles none ; corolla small .....**15. Micranthus.**

Placentas not separating elastically from the base of the ripe capsule :—

Anthers minutely mucronate at base ; stamens 4
16. Dyschoriste.

Anthers not spurred at the base :—

Corolla subequally 5-lobed :—

Stamens 2 ; corolla-tube long and linear
17. Eranthemum.

Stamens 4 or 2; corolla-tube usually short and cylindric below, ventricose above 18. **Strobilanthes.**

Corolla deeply 2-lipped; stamens 4..19. **Calacanthus.**

Corolla-lobes imbricate in bud :—

Ovules 3–10 in each cell; capsule normally 6- or more-seeded :—

Capsule compressed at right angles to the septum; seeds ovoid hardly compressed :—

Flowers in panicled often unilateral racemes, without axillary cladodes .....20. **Andrographis.**

Flowers clustered in the midst of axillary cladodes 21. **Haplanthus.**

Capsule subterete; seed much compressed :—

Corolla-tube slender, the limb shortly 2-lipped 22. **Gymnostachyum.**

Corolla-tube short, the limb deeply 2-lipped 23. **Diotacanthus.**

Ovules 2 or rarely 1 in each cell :—

Corolla-lobes 5, subequal :—

Anthers 1-celled; 2 inner calyx-lobes smaller than the outer .....24. **Crossandra.**

Anthers 2-celled :—

Calyx 4-partite, the anterior lobe of the outer pair more or less bifid; 2 stamens only fully perfect 25. **Barleria.**

Calyx 2-partite, the upper lip 3- the lower 2-lobed; 4 stamens, one pair perfect the other imperfect 26. **Neuracanthus.**

Calyx 5-partite :—

Stamens 4; corolla-tube cylindric below, inflated above.....27. **Asystasia.**

Stamens 2; corolla-tube long and slender, limb spreading .....28. **Pseuderanthemum.**

Corolla distinctly 2-lipped :—

Stamens 4, anthers 2-celled; bracts conspicuous, often spinous.....29. **Lepidagathis.**

Stamens 2 :—

Anthers 1-celled; bracts and bracteoles linear-setaceous .....30. **Monothecium.**

Anthers 2-celled :—

Placentae separating elastically from the valves, from the base :—

Bracts in 1-sided spikes, some of the rows barren
31. **Rungia.**

Bracts clustered in the leaf-axils or laxly cymose
32. **Dicliptera.**

Placentas not separating elastically from the valves :—

Anther-cells parallel, subequal; bracts large, imbricate .....33. **Eebolium.**

Anther-cells one higher up than the other :—

Anther-cells with a white basal spur-like appendage .....34. **Justicia.**

Anther-cells not appendaged spur-like at base:—

Anther-cells minutely apiculate at base; bracts large .....35. **Adhatoda.**

Anther-cells muticous; capsule at base stalked :—

Corolla-tube short, limb small
36. **Dianthera.**

Corolla-tube long and slender, the upper lip linear-oblong, the lower broad; bracts and bracteoles small; corolla white
37. **Rhinacanthus.**

Corolla-tube slender, often twisted; bracts larger than bracteoles in opposite pairs: corolla rose or purple ....38. **Peristrophe.**

1. Thunbergia, Linn. f.

Climbers, rarely erect. *Leaves* opposite, often cordate hastate or angular palminerved. *Flowers* axillary or in racemes, large or moderate-sized; bracts at the base of the pedicels leaf-like; bracteoles large, enclosing the flower buds. *Calyx* small, annular or 10–16-toothed or obscure. *Corolla* conspicuous, the tube cylindric or ventricose, curved, the limb oblique; lobes 5, twisted to the left in bud. *Stamens* 4, didynamous, inserted near the base of the corolla-tube; anthers 2-celled, the cells parallel, sometimes spurred at the base. *Disk* annular or cushion-like. *Ovary* 2-celled; ovules 2 in each cell; style long; stigma funnel-shaped 2-lobed or entire, or style bifid with capitate stigmas. *Fruit* a capsule, globose below, suddenly narrowed to a barren sword-shaped beak. *Seeds* 2 in each cell, globose, the base hollowed or flattened, the funicle minute or conic, no retinacula.

Flowers axillary, solitary or in pairs on long pedicels; calyx 10–16-toothed :—

Flowers white, leaf-petioles not winged :—

Calyx-teeth linear lanceolate, up to ·15 in. long; leaves ovate or oblong, cordate or hastate at base, often angularly lobed, from nearly glabrous to softly tomentose; capsule glabrous or puberulous ..... 1. *fragrans.*

Calyx-teeth filiform, very villous, up to ·25 in. long; leaves ovate or ovate-lanceolate, cordate to hastate with spreading lobes at base, tomentose when young afterwards nearly glabrous; capsule villous ..... 2. *tomentosa.*

Flowers yellow with purple-black brown or claret-coloured throat; leaf-petioles winged; leaves ovate cordate or hastate, villous; calyx-lobes short, villous; capsule villous, the beak slender 3. *alata.*

Flowers in racemes, the lower ones often axillary; calyx an entire or slightly crenulate ring :—

Flowers bright yellow or orange, the tube purplish, in long pendent racemes; anthers bearded and with a long slender spur to each cell; leaves lanceolate, acuminate, up to 6 in. long, 2 in. broad, sometimes ovate and up to 3 in. broad, slightly dentate, prominently 3-ribbed and coarsely reticulate, glabrous ..... 4. *mysorensis.*

Flowers pale blue :—

Racemes long, pendent, the bracteoles very prominent, orbicular-cordate, mucronate, about 1 in. in diam. and usually 7-ribbed; anthers glabrous with a long spur to each cell; leaves elliptic-ovate, long-acuminate, up to 5 in. long, 4 in. broad, repand-dentate, 5-ribbed and reticulate ..... 5. *Wightiana.*

Racemes stout, rather dense-flowered, with flowers also in upper axils, solitary or in pairs; bracteoles elliptic-falcate about 1·25 in. long; anthers bearded and spurred; leaves deeply cordate, angular, about 5 in. in diam. ..... *grandiflora.*

1 THUNBERGIA FRAGRANS, Roxb. Cor. Pl. t. 67; F. B. I. iv. 390.

All Districts, but especially on the E. side, up to about 4,000 ft., in the hills, both the species and the varieties *laevis* and *vestita.*

A slender twiner with variable leaves, the end branches having them rather narrow and oblong lanceolate, the flowers not fragrant.

Var. *laevis*, C. B. Clarke. Calyx-tube rather long and stiff.

nearly glabrous, the teeth short; leaves thin and reticulate; pedicels often much thickened.

Var. *vestita*, C. B. Clarke. Calyx-tube short, teeth linear, very villous; leaves thick, tawny-villous, often tomentose.

Var. *hispida*, Gamble. Stems and leaves hispid, sometimes nearly strigose; leaves broadly ovate, subcordate, apiculate, repand; bracteoles large; calyx teeth villous.

N. Circars, Mahendragiri in Ganjam (Fischer), Vantabla in Vizagapatam (A. W. Lushington), about 4,000 ft.

2. THUNBERGIA TOMENTOSA, Wall.; F. B. I. iv. 391.

W. Ghâts, Nilgiri Hills, at 5,000–6,500 ft. (Wight and others), at Coonoor (Meebold); Sirumalai Hills of Madura.

A slender climber with prominent large ovate bracteoles, slender cylindric corolla-tube 1·25 in. long and large rounded lobes, the mature leaves reticulately nerved and with long basal auricles.

3. THUNBERGIA ALATA, Bojer Ex. Sims Bot. Mag. t. 2591; F. B. I. iv. 391.

Most Districts, cultivated in gardens and apparently run wild in places in the W. Ghâts, native of Tropical Africa.

A slender climber.

4. THUNBERGIA MYSORENSIS, T. And.; F. B. I. iv. 393. *Hexacentris mysorensis*, Wt. Ic. t. 871.

W. Ghâts, S. Canara and Mysore to Travancore and Tinnevelly, up to 3,000 ft.

An extensive glabrous climber with long slender branches, the flowers pendent with long open corolla-lip, the bracteoles ovate-oblong, purplish-green.

5. THUNBERGIA WIGHTIANA, T. And.; F. B. I. iv. 393. *Schmidia bicolor*, Wt. Ic. t. 1848.

W. Ghâts, Nilgiri Hills, W. side, below Sispara, about 5,000 ft.

A large climber with long pendent branches, the conspicuous bracteoles 2-coloured, half red and half green.

Thunbergia grandiflora, Roxb.; F. B. I. iv. 392; Wt. Ic. t. 872 is a large and beautiful blue-flowered climber, native of Eastern Bengal, frequently grown in gardens. *T. erecta*, T. And., is an erect shrub about 6 ft. high with purple or white flowers, a native of Tropical Africa, often grown in gardens.

2. Meyenia, Nees.

A climber. *Leaves* opposite, coriaceous. *Flowers* large, usually solitary, axillary, pedicellate; bracteoles large, ovato-oblong. *Calyx* small, obscurely 5-lobed. *Corolla* funnel-shaped, the throat gradually enlarged; lobes 5 spreading, subequal. *Stamens* 4, didynamous; anthers bearded at the apex, those of the longer pair with unequal cells, one long and narrow, the others spurred at the base, those of the shorter with subequal cells, not spurred, pollen-grains crimped on the margins. *Ovary* 2-celled; ovules 2 in each cell; style slender; stigma 2-lobed, each lobe with a fold behind. *Fruit* a capsule, swollen at the base, with a broad conical beak, 4-seeded. *Seeds* subglobose, the funicle in a small cavity, no retinacula; cotyledons unequal.

MEYENIA HAWTAYNEANA, Nees; Wt. Ic. t. 1487. *Thunbergia Hawtayneana*, Wall. Pl. As. Rar. t. 164; F. B. I. iv. 391.

Deccan and Carnatic, in hilly country, up to 4,000 ft. · W Ghâts, from S. Canara to Nilgiris and Pulneys, on E. slopes chiefly, in dry country.

A small climbing shrub with slender branches, beautiful blue-purple flowers and ovate acute sessile reticulate leaves up to 4·5 in. long, 2 in. broad.

3. Elytraria, Vahl.

Herbs, nearly stemless. *Leaves* alternate, crowded, subradical. *Flowers* small, in close rigid, simple or branched, spikes, the scapes closely covered by spirally imbricate bracts, the upper ones larger and flower-bearing; bracteoles small. *Calyx* 4-partite, the segments unequal. *Corolla*-tube linear; limb 2-lipped; lobes 5, the lower longest, imbricate in bud. *Stamens* 2 perfect; anthers elliptic, the cells parallel, sometimes with a minute spur. *Disk* small. *Ovary* oblong, 2-celled; ovules 6–10, superposed, in each cell; style slender; stigma shortly 2-lobed. *Fruit* an oblong acute capsule. *Seeds* small, reticulate, not on retinacula; cotyledons small, round.

ELYTRARIA ACAULIS, Lindau. *E. crenata*, Vahl; F. B. I. iv. 394. *Justicia acaulis*, Linn. f.; Roxb. Cor. Pl. t. 127.

N. Circars, Deccan and Carnatic, in dry Districts, in grassy lands and open forest undergrowth.

A scapigerous herb with small white flowers on long bracteate scapes, the leaves obovate, crenate, obtuse, up to 8 in. long, 2·5 in. broad, the bases surrounded by woolly hairs.

4. Nelsonia, R. Br.

Diffuse softly villous herbs. *Leaves* opposite, entire, subequal. *Flowers* small, in dense short spikes with many ovate closely imbricate glandular villous bracts; bracteoles 0. *Calyx* small, 4-partite; lobes unequal, lanceolate, the larger often bifid. *Corolla* small; tube slender; limb 2-lipped; lobes spreading, obtuse. *Stamens* 2, attached above the middle of the corolla-tube; anthers 2-celled, the cells ellipsoid, divergent, muticous or minutely spurred. *Ovary* 2-celled; ovules 8–10 in each cell; style slender; stigma shortly 2-lobed. *Fruit* an oblong, acute capsule, the lower part seed-bearing only. *Seeds* small, subglobose, granular, no retinacula.

NELSONIA CAMPESTRIS, R. Br.; F. B. I. iv. 394.

N. Circars, in undergrowth of deciduous fruit; W. Ghâts, Mysore, Malabar and Travancore, at low levels.

A soft trailing herb with purplish flowers, the lower leaves large, oblong, up to 9 in. long, 2 in. broad, long-petioled, the upper ones much smaller and often sessile.

5. Staurogyne, Wall.

Herbs or small undershrubs. *Leaves* opposite, rarely alternate, usually petioled with smaller leaves in the axils. *Flowers* small, in terminal or also axillary, simple or compound, lax or dense, spikes or racemes; bracts small or large and leafy; bracteoles 2, small. *Calyx* deeply 5-partite; segments linear or oblong, subequal or one larger than the others. *Corolla*-tube cylindric or funnel-shaped; limb 2-lipped; lobes 5, short, spreading. *Stamens* 4, didynamous, included, with sometimes a minute staminodial fifth; filaments hairy; anthers with 2 ovoid separate muticous cells. *Disk* small. *Ovary* oblong, 2-celled; ovules numerous; style slender; stigma of 2 narrow lobes, one often again 2-lobed. *Fruit* an oblong capsule with many seeds, seed-bearing throughout. *Seeds* many, globose, smooth or pitted, the hilum hollowed, no retinacula.

Stem erect, the branches not trailing, viscous-pubescent; upper leaves or nearly all alternate, spathulate; bract narrow spathulate, bracteoles 2 linear, small; seeds globose, not pitted.....1. *glauca.*
Stem-branches trailing with short erect stems from the nodes, hispid, not viscous; leaves all opposite, elliptic-oblong or obovate; bract broad, obovate, bracteoles 2 linear-lanceolate; seeds pitted
2. *zeylanica.*

1. STAUROGYNE GLAUCA, O. Kze. *Ebermaiera glauca*, Nees; F. B. I. iv. 395; Wt. Ic. t. 1488. *E. ligulata*, Bedd. Ic. t. 245.
   N. Circars, in Ganjam (Gamble); Deccan, in Kurnool, Nallamalai Hills (Beddome); W. Ghâts, Coorg to Travancore, in wet places.
   An erect viscous herb with purplish flowers, striped rose or yellow.
2. STAUROGYNE ZEYLANICA, O. Kze. *Ebermaiera zeylanica*, Nees; F. B. I. iv. 397.
   Deccan, in Mysore; W. Ghâts from S. Canara to Travancore, not common.
   A herb of wet places in the forests with trailing branches.

6. Cardanthera, Buch.-Ham.

Aromatic, often viscid herbs. *Leaves* opposite, often lineolate, the upper toothed, rarely entire, the lower often pinnatifid, or if submerged, pectinate. *Flowers* in spikes or axillary whorls or 1–3 in the leaf-axils; bracts and bracteoles foliaceous, but often suppressed. *Calyx* 5-partite, the lobes narrow, often unequal. *Corolla*-tube straight; limb 2-lipped, the upper erect, 2-lobed, the lower 3-lobed with a transversely plaited palate. *Stamens* 4, didynamous, anthers of the posterior pair often smaller, cells parallel. *Ovary* narrow, 2-celled; ovules many; style slender; stigma linear, bent. *Fruit* a narrow 2-celled capsule, many-seeded throughout. *Seeds* very many, small, ovoid; retinacula minute, conical, straight.

Flowers in terminal spikes with ovate imbricating bracts; calyx-lobes linear; leaves ovate or oblong or spathulate, up 2·5 in. long, ·5 in. broad, entire or crenate.....1. *ulligincea.*
Flowers in axillary whorls:—
Glabrous or nearly so; bracts and calyx-lobes linear-lanceolate,

acuminate; leaves oblong, crenate-serrate, up to 2 in. long, ·4 in. broad, the lower ones sometimes pinnatifid.....2. *balsamica.*
Crispate-villous; bracts and calyx-lobes spathulate, obtuse; leaves elliptic or obovate, up to 1 in. long, ·3 in. broad, crenulate
3. *verticillata.*

Flowers solitary in opposite axils, rarely in loose spikes; bracts obovate; calyx-lobes linear, often toothed; leaves deeply pinnatifid, up to 4 in. long, 1 in. broad.....4. *pinnatifida.*

1. CARDANTHERA ULIGINOSA, Buch.-Ham.; F. B. I. iv. 403.
   N. Circars, Ganjam (Gamble), Godavari in sugar-cane gardens (Bourne); Carnatic, near Madras, in drying rice-fields (Wight); W. Ghâts, Anamalai Hills, at 800 ft. (Fischer).
   An erect or decumbent branching annual herb with purplish (?) flowers.
2. CARDANTHERA BALSAMICA, C. B. Clarke; F. B. I. iv. 404. *Adenosma balsamea*, Spr.; Wt. Ic. t. 446.
   N. Circars, Deccan and Carnatic, in rice-fields, common.
   An erect or decumbent branching annual herb with pink or lilac flowers.
3. CARDANTHERA VERTICILLATA, C. B. Clarke; F. B. I. iv. 404. *Adenosma verticillata*, Nees; Wt. Ic. t. 1524.
   Deccan, in Mysore (Wight); S. Canara (Beddome) in rice-fields.
   An erect annual herb with purplish flowers, often rooting below.
4. CARDANTHERA PINNATIFIDA, C. B. Clarke; F. B. I. iv. 405. *Adenosma pinnatifida*, T. And.; Bedd. Ic. t. 246.
   S. Canara (Wight), on river banks (Dalzell).
   A slender glandular herb with purple flowers and pinnatifid leaves.

7. Blepharis, Juss.

Herbs or undershrubs, often spinous. *Leaves* opposite or 4 in a whorl, sometimes unequal, subentire toothed or spinous. *Flowers* small or moderate-sized, in terminal spikes or on suppressed lateral branches; spikes 1- or few-flowered or capitate or strobilate; bracts in several opposite decussate pairs. *Calyx* 4-partite; lobes unequal, in opposite pairs, the inner smaller. *Corolla*-tube horny, upper lip subobsolete, lower spreading, flat,

with 3–5 rounded lobes. *Stamens* 4, didynamous; filaments thick, rigid, the anterior ones produced beyond the insertion of the anthers; anthers 1-celled, the margins thickly bearded, the 2nd cell small or obsolete. *Disk* annular. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma shortly 2-fid. *Capsule* oblong or ovoid, 2- or 4-celled. *Seeds* compressed, orbicular, echinate-papillose, on rigid retinacula.

Leaves in opposite pairs, ovate-lanceolate, acute, entire or spinous-dentate, up to 3 in. long, 1·5 in. broad, with scattered bulbous-based hairs; flowers solitary or in few-flowered terminal spikes; bracts 3 pairs, the middle pair 3-toothed; calyx with the outer lobe spathulate, 1 in. long, the opposite one nearly as long, 2-toothed, the inner pairs smaller, lanceolate; corolla lip 1 in. long; capsule oblong, 4-seeded, the seeds shortly softly echinate, on obtuse retinacula ..1. *asperrima.*
Leaves 4 in a whorl; flowers solitary or 2–3 together; bracts 4 pairs, all with glochidiate spinous teeth; capsule ovoid, 2-seeded, the seeds with long processes, on sharp retinacula :—
Leaves petioled, membranous, up to 5 in. long, 2 in. broad, coarsely toothed; calyx with the outer lobe 1 in. long, oblong, the opposite one similar but smaller, the inner pair smaller still; corolla lip up to 1 in. long.....2. *boerhaaviaefolia.*
Leaves subsessile, thick, obovate-oblong, up to 1 in. long, ·3 in. broad, entire, with long scattered hairs; calyx with outer lobe ·3 in. long, the opposite one similar, 2-toothed, the inner pair linear; corolla-lip ·35 in. long .....3. *molluginifolia.*

1. BLEPHARIS ASPERRIMA, Nees; F. B. I. iv. 478; Wt. Ic. t. 1534.
W. Ghâts, hills of S. Canara, Mysore and Coorg.
A diffuse, erect or prostrate, herbaceous plant with blue flowers, the bracts and calyx white with green veins.
2. BLEPHARIS BOERHAAVIAEFOLIA, Pers.; F. B. I. iv. 478; Wt. Ic. t. 458.
N. Circars, Deccan and Carnatic, in dry Districts, but usually in shady places, up to 4,000 ft.
A prostrate wiry undershrub with pale blue or pink flowers, veined darker and with a yellow spot on the lip, the bracts white veined with green.
3. BLEPHARIS MOLLUGINIFOLIA, Pers.; F. B. I. iv. 479.
N. Circars, Deccan and Carnatic, on dry stony lands, or sandy places near the sea.

A prostrate wiry undershrub with small blue flowers, the capsules always closely surrounded by the bracts and calyx-lobes.

8. Acanthus, Linn.

Erect or twining herbs or shrubs. *Leaves* pinnatifid, toothed, spinous, rarely entire, the petioles sometimes with spines at their bases. *Flowers* in terminal or pseudo-axillary, strobilate or interrupted spikes; bracts ovate, large, spinescent or small, decussate bracteoles large lanceolate, or 0. *Calyx* 4-partite, the outer 2 lobes the larger. *Corolla*-tube short, horny, upper lip obsolete, lower elongate, obovate, shortly obtusely 3-lobed. *Stamens* 4, didynamous, shorter than the lower lip; filaments stout, curved, not produced beyond the anther; anthers 1-celled, oblong, bearded. *Disk* 0. *Ovary* 2-celled; ovules 2 in each cell; style slender; stigma bifid. *Capsule* ellipsoid, compressed, shining. *Seeds* 4, compressed, orbicular; testa lax and often soft and corrugated.

ACANTHUS ILICIFOLIUS, Linn.; F. B. I. iv. 481. *Dilivaria ilicifolia*, Juss.; Wt. Ic. t. 459.

East and West Coasts, in tidal forests. Sea Holly.

A gregarious shrub reaching 5 feet in height with large blue flowers and spinous holly-like leaves, sharp spines also at the bases of the petioles. Vern. *Hind.* Hargoza; *Tel.* Alisi, Alchi; *Mar.* Marandi.

9. Asteracantha, Nees.

A stout herb of wet places; stems numerous, with long sharp thorns at the nodes. *Leaves* narrow, lanceolate, lineolate, in whorls of 6, the two outer leaves of each whorl the larger. *Flowers* in sessile axillary whorls, surrounded by the slightly recurved spines; bracts leafy; bracteoles linear-lanceolate. *Calyx* deeply 4-partite, the upper lobe the largest. *Corolla* 2-lipped, the upper lip 2- the lower 3-lobed with 2 crested folds on the palate; tube cylindric below, enlarged above. *Stamens* 4, didynamous; anthers 2-celled, equal, the cells parallel. *Ovary* 2-celled; ovules 4 in each cell; style pubescent; stigma simple. *Fruit* a linear-oblong capsule. *Seeds* 4–8 on hard retinacula, flat and white-hairy when wet.

ASTERACANTHA LONGIFOLIA, Nees; Wt. Ic. t. 449. *Hygrophila spinosa*, T. And.; F. B. I. iv. 408.

All plains Districts, in wet places, rice-fields, the margins of tanks, etc., common.

A tall hispid herb with pale blue-purple flowers and leaves up to 7 in. long, 1 in. broad. Vern. *Hind.* Talmakhana, Kantakalia; *Tam.* Nirmuli.

10. Hygrophila, R. Br.

Herbs, usually found in wet places. *Leaves* opposite, entire, usually lineolate on the upper surface. *Flowers* bluish-purple, sessile, in terminal heads or axillary whorls; bracts elliptic or lanceolate; bracteoles linear or lanceolate. *Calyx* tubular, 5-fid; lobes linear or lanceolate. *Corolla*-tube dilated above; limb 2-lipped, nearly glabrous, lobes twisted to the left in bud. *Stamens* 4, didynamous, the posterior pair sometimes smaller or rudimentary; filaments glabrous; anthers oblong, the cells equal, divaricate or connate at the base. *Ovary* oblong, the tip pubescent; ovules few or many in each cell; style slender, hairy; stigma simple, linear. *Fruit* a narrowly oblong capsule, seed-bearing from the base. *Seeds* numerous, rarely few, ovoid, compressed, hygroscopically hairy; retinacula hard, curved, acute.

Procumbent herbs with flowers in terminal spikes, the leaves small :—

Spikes 1–5 in. long, glabrous or slightly pubescent; fertile stamens 2 only, the posterior pair reduced to slender curved staminodes; leaves usually glabrous, ovate or oblong, obtuse, ·5–·15 in. long; seeds 20 or more ..... 1. *polysperma*.

Spikes under 1 in. long, white-strigose; fertile stamens 4, the anthers of the posterior pair smaller; leaves hairy, elliptic or sub-orbicular, ·25–·5 in. in diam.; seeds 8–10 ..... 2. *Serpyllum*.

Erect herbs with flowers in axillary whorls, the leaves rather large :

Bracteoles acute, lanceolate, hispid-ciliate; calyx divided halfway down, the lobes acuminate and white hispid-ciliate; leaves linear or linear-lanceolate ..... 3. *angustifolia*.

Bracteoles obtuse, oblong, strigose; calyx divided one-third way down, the lobes long acuminate, strigose but scarcely hispid-ciliate; leaves obovate or elliptic ..... 4. *quadrivalvis*.

1. HYGROPHILA POLYSPERMA, T. And.; F. B. I. iv. 406. *Hemiadelphis polysperma*, Nees; Wt. Ic. t. 1492.

N. Circars, in Kimedy (Beddome).

A branching and rooting small herb of wet places with pale blue flowers.

2. HYGROPHILA SERPYLLUM, T. And.; F. B. I. iv. 406. *Physichilus Serpyllum*, Nees; Wt. Ic. t. 1493.

Deccan, in Mysore (J. Campbell).

A small branching herb of variable forms of leaf, from a woody rootstock.

3. HYGROPHILA ANGUSTIFOLIA, R. Br. *H. salicifolia*, Nees; F. B. I. iv. 407; Wt. Ic. t. 1490.

N. Circars, in Godavari; W. Ghâts, in all Districts from S. Canara and Mysore southwards, up to 4,000 ft.; in swampy places and along streams.

An erect herb up to 3 ft. in height, usually rooting at the lower nodes, the stems more or less quadrangular, the leaves narrow, the flowers pale purplish-blue.

4. HYGROPHILA QUADRIVALVIS, Nees; F. B. I. iv. 408. *H. obovata*, Wt. Ic. t. 1489.

W. Coast and W. Ghâts, up to 3,000 ft., in swampy places.

An erect herb, very similar to No. 3, and, like it, rooting at the lower nodes and with subquadrangular stems, the leaves obovate or lanceolate glabrate, the flowers pale purplish-blue.

11. Ruellia, Linn. (Sect. *Dipteracanthus*, Nees.)

Herbs or undershrubs. *Leaves* opposite, entire or undulate, lineolate. *Flowers* sessile or subsessile, solitary or in clusters or racemes; bracts 0, bracteoles large, usually exceeding the calyx. *Calyx* 5-partite or 5-fid; lobes subequal, narrow, acute. *Corolla* tubular-ventricose, more or less oblique; lobes subequal, rounded, twisted to the left in bud, spreading in flower. *Stamens* 4, didynamous; filaments glabrous except at base; anthers subequal, 2-celled, cells oblong, muticous, glabrous. *Ovary* 2-celled; ovules 3–10 in each cell; style linear; stigma simple. *Fruit* a clavate capsule, solid at the base, seed-bearing upwards. *Seeds* large thin, discoid, margined, hygroscopically hairy, on strong hooked retinacula.

Stems prostrate or straggling; leaves ovate or elliptic, acute, glabrous or slightly hairy, up to 1·5 in. long, 1 in. broad; calyx-lobes linear-subulate, ciliate; capsules slightly pubescent, seeds 16–20

1. *prostrata.*

Stems erect; leaves ovate, obtuse, grey-pubescent, often undulate, up to 1 in. long, ·75 in. broad; calyx-lobes lanceolate, acute, pubescent; capsules glabrous, seeds about 12.....2. *patula.*

1. RUELLIA PROSTRATA, Poir.; F. B. I. iv. 411; Bedd Ic. t. 282.

   Most dry Districts, in bushy places, on banks, in gardens, etc.

   A diffuse undershrub with solitary pale blue or purple flowers.

2. RUELLIA PATULA, Jacq.; F. B. I. iv. 412. *Dipteracanthus patulus*, Nees: Wt. Ic. t. 1505.

   Deccan and Carnatic to S. Travancore, on waste lands and by road-sides, common.

   A hoary small undershrub with purplish blue flowers, solitary or 2–3 together in the leaf-axils.

R. tuberosa, Linn., is a tropical American plant with deep blue flowers frequently found in Madras Gardens.

12. Hemigraphis, Nees.

Herbs, undershrubs or shrubs. *Leaves* opposite, toothed or subentire. *Flowers* sessile, in heads or spikes, terminal or pseudo-axillary on shortened branchlets, rarely paniculate or solitary; bracts large, imbricate, each 1-flowered; bracteoles small and narrow or 0. *Calyx* 5-partite; lobes unequal, lanceolate or linear. *Corolla* tubular-ventricose or funnel-shaped; lobes 5, subequal, twisted to the left in bud. *Stamens* 4, didynamous; included or nearly so; anthers oblong, 2-celled, muticous, the bases acute. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma 2-lobed, one lobe linear, the other short. *Fruit* a linear or linear-oblong capsule, seed-bearing almost from the base. *Seeds* 6 or more compressed, discoid, hygroscopically hairy.

Corolla tubular-ventricose; longer filaments glabrous in the upper half, hairy below :—

Stiff herbs, hispid with jointed hairs; heads large with 4 large hispid reticulate outer bracts, inner bracts oblong or spathulate, bracteoles linear or 0; calyx-lobes linear, ·4 in. long; leaves oblong-spathulate, up to 2 in. long, crenulate; capsule linear-oblong, glabrous, grooved, ·5 in. long, seeds 6–8.....1. *dura.*

Soft herbs, villous with white hairs :—

Hairs soft; corolla long-cylindric below, upper part funnel-

shaped ventricose; bracts elliptic, bracteoles 0; calyx-lobes linear, obtuse, ·3–·4 in. long; leaves ovate, crenate, up to 1 in. long; capsule linear-obovoid, glabrous except at tip, ·3 in. long, about 12-seeded .....2. *hirta.*

Hairs scabrous; corolla short-cylindric below, upper part campanulate-ventricose; bracts obovate, bracteoles 0, calyx-lobes lanceolate, acuminate, ·2 in. long; leaves ovate, crenate, up to 2 in. long; capsule not seen .....3. *venosa.*

Corolla funnel-shaped; longer filaments densely bearded in the upper half :—

Bracts of inner flowers short, ovate lanceolate; heads axillary and terminal, with many soft stiff white hairs; calyx-lobes linear, strigose at first then scarious, one longer than the rest; leaves ovate, acuminate, crenate-serrate, up to 3 in. long, 2 in. broad, petioles usually long; capsule pubescent, tetragonous, ·25 in. long, 6-seeded .....4. *latebrosa.*

Bracts of inner flowers long, oblong; heads mostly terminal, glandular-hairy, with white hairs; calyx-lobes linear, one longer than the rest; leaves ovate, subobtuse, crenate, up to 1·5 in. long, 1 in. broad, petioles rather short; capsule hispid-pubescent, ·3 in. long, 8–10-seeded .....5. *elegans* var. *crenata.*

1. HEMIGRAPHIS DURA, T. And.; F. B. I. iv. 422.

Deccan, Bellary and Kurnool, East to Guntur and Masulipatam, usually on black cotton soil; S. Canara (Hohenacker).

A procumbent hard very hispid herb with flexuose branches and blue flowers in large heads.

2. HEMIGRAPHIS HIRTA, T. And.; F. B. I. iv. 422

E. Coast, in Chicacole (Gamble).

A softly pubescent herb with creeping flexuose stems and pale blue flowers in small close terminal heads.

3. HEMIGRAPHIS VENOSA, C. B. Clarke; F. B. I. iv. 423.

Deccan or Carnatic (locality doubtful).

A scabrous pubescent herb with creeping and rooting stems.

4. HEMIGRAPHIS LATEBROSA, Nees; F. B. I. iv. 423; Wt. Ic. t. 1504.

N. Circars, Deccan and Carnatic, in undergrowth of deciduous forest, up to 4,000 ft. in hilly country.

A softly pubescent branching and straggling undershrub, with blue flowers, the tube yellowish white.

Var. *Beddomei*, C. B. Clarke. Leaves smaller, ovate, crenate nearly glabrous, fruiting sepals white scarious.

Deccan, Ramandrúg in Bellary (Beddome).

Var. *incana*, Gamble. Similar but the leaves very softly white-tomentose and thicker.

Deccan, Horsleykonda in Chittoor (Gamble, Fischer), Wt. K. D. 2272 without locality.

5. HEMIGRAPHIS ELEGANS, Nees; F. B. I. iv. 424.

Var. *crenata*, C. B. Clarke.

S. Canara near Malasamudra (Hohenacker); Ramandrúg in Bellary (Beddome).

A viscid pubescent herb, the flowers blue with a pale tube.

13. Stenosiphonium, Nees.

Shrubs, often viscous and with glandular-headed hairs. *Leaves* opposite, usually ovate, the lower one long-petioled with decurrent blade, the upper subsessile, all densely lineolate. *Flowers* sessile, in clusters on elongate interrupted spikes, forming leafy panicles; bract ovate or lanceolate; bracteoles 2, linear, similar to the calyx-lobes. *Calyx* subequally 5-fid, the lobes at first connate, later on separating, linear or lanceolate. *Corolla* narrowly tubular below then suddenly bent obliquely and widened to a ventricose limb; lobes 5, subequal, rounded, twisted to the left in bud. *Stamens* either 2 perfect with sometimes 2 small staminodes, or 4 perfect, the posterior shorter and with smaller anthers than the exsert anterior; anthers oblong, muticous. *Ovary* glabrous; style slender; stigma linear. *Fruit* a clavate capsule, seed-bearing nearly from the base, the retinacula hard. *Seeds* 6–8, compressed, discoid, apparently glabrous when dry, densely white hairy all round when wetted.

Stamens 2; leaves ovate, acuminate, up to 3 in. long, 1·5 in. broad, the lower petioled, the upper often sessile and cordate, nerves 5–7 pairs:—

Spikes with dense but interrupted clusters, prominently viscous-pubescent; corolla ·75 in. long with lower half tubular narrow, upper broadly ventricose:—

Bracts ovate or obovate, shortly obtusely acute, ·25 in. long, bracteoles linear, equal to the calyx; calyx ·3–·4 in. long, lobes linear, glandular; leaves crenate-serrate.....1. ***diandrum.***

Bracts linear-lanceolate, narrow, ·3 in. long, bracteoles similar but narrower; calyx ·3 in. long, lobes linear, hair-pointed, very glandular; leaves shallowly dentate.....2. *setosum.*

Spikes slender, interrupted, with small clusters, glandular pubescent; corolla under ·5 in. long, lower half very narrow, upper ventricose; bracts lanceolate, acuminate, ·25 in. long, bracteoles linear; calyx ·25 in. long, the lobes linear glabrate but scabrous; leaves dentate 3. *parviflorum.*

Stamens 4, the 2 anterior longer than the 2 posterior and with anthers twice the size; leaves ovate, acuminate; corolla about ·75 in. long, the tube slender:—

Spikes with close clusters especially the upper ones, white villous and viscous-pubescent; bracts obovate, shorter than the calyx; leaves shortly acuminate, shallowly crenate, up to 3 in. long, 2 in. broad, 5–7-nerved, glabrous, the lower petioled, the upper subsessile and subcordate .....4. *confertum.*

Spikes with distant clusters, nearly glabrous when young, very glandular hairy when old; bracts ovate or obovate, obtusely acute, as long as the calyx, 3-ribbed; leaves caudate-acuminate, strongly crenate-serrate, up to 6 in. long, 2–3 in. broad, 7–8-nerved, glabrous above, sometimes white silky beneath, the lower long-petioled, the upper rounded or subcordate at base .....5. *Russellianum.*

1. STENOSIPHONIUM DIANDRUM, Wt. Ic. t. 1502; F. B. I. iv. 426.

Hills of Tinnevelly, at Courtallum (Wight).

An erect shrub with apparently pale blue flowers.

2. STENOSIPHONIUM SETOSUM, T. And.; F. B. I. iv. 427.

Deccan or Carnatic (G. Thomson).

An erect shrub with pale blue flowers and very long hair-like tips to the calyx-lobes, covered with glandular hairs.

3. STENOSIPHONIUM PARVIFLORUM, T. And.; F. B. I. iv. 428.

Deccan or Carnatic (G. Thomson); evergreen forests of Travancore (M. Rama Rao).

An erect shrub with small pale blue flowers.

4. STENOSIPHONIUM CONFERTUM, Nees; F. B. I. iv. 427; Wt. Ic. t. 873 (*note under* t. 1503.)

Deccan and Carnatic, hills of Kistna and Kurnool, also Chingleput, westwards to Coimbatore and the E. slopes of the Ghâts down to Tinnevelly.

An erect shrub with blue flowers.

5. STENOSIPHONIUM RUSSELLIANUM, Nees; F. B. I. iv. 427; Wt. Ic. t. 1503.

N. Circars, in Vizagapatam; Deccan, hills of Mysore, Cuddapah and Chittoor; W. Ghâts, on E. slopes, down to Tinnevelly.

An erect shrub with blue flowers and long-acuminate leaves.

Var. *subsericeum*, T. And. The young leaves sometimes smaller, but in old plants rather large, densely white-silky beneath, becoming glabrate when older; flowers deep blue.

Deccan, N. Arcot and Chittoor, to 4,000 ft. on Horsley-konda; Carnatic, Kambakam Hills of Chingleput, southwards to the hills of Tinnevelly.

14. Petalidium, Nees.

Shrubs or undershrubs. *Leaves* opposite, entire or toothed *Flowers* shortly pedicelled, in contracted axillary cymes or racemes, often crowded on shortened lateral branchlets, sometimes reduced to a single flower; bracts narrow or 0; bracteoles large, ovate, reticulate, ultimately scarious. *Calyx* 5-partite, lobes unequal, narrowly linear-lanceolate. *Corolla* large, ventricose, straight or curved; lobes 5, subequal, twisted to the left in bud. *Stamens* 4, didynamous, anthers subsimilar, 2-celled, cells parallel, spurred or muticous at the base. *Ovary* 2-celled, ovules 2 in each cell; style long; stigma with 2 unequal lobes *Fruit* a clavate capsule, compressed parallel to the septum, placentas separating elastically from the bottom and carrying off the seeds. *Seeds* 2 or 4, discoid, hygroscopically hairy, the retinacula rigid.

PETALIDIUM BARLERIOIDES, Nees; F. B. I. iv. 416.

N. Circars, Ganjam to the Kistna, in deciduous forest, common; W. Coast, in S. Canara.

A handsome shrub reaching 5 ft. in height, the leaves up to 6 in. long, 3 in. broad and long-petioled, the large flowers white or pale blue, 1–1·5 in. long with conspicuous pale reticulate bracteoles.

15. Micranthus, Wendl.

Perennial glandular hairy herbs. *Leaves* opposite, membranous, lineolate, entire or obscurely crenate, ovate, petioled,

Flowers in dense, terminal, 1-sided spikes; bracts orbicular, imbricate, each pair with usually 3 flowers; bracteoles 0. *Calyx* 5-partite, one lobe ovate, bract-like, the others linear-subulate. *Corolla* small; tube slender, cylindric; lobes slightly unequal, rounded, twisted to left in bud. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, oblong, the base minutely mucronate. *Ovary* 2-celled; ovules 2 in each cell; style long, villous; stigma shortly 2-lobed. *Fruit* a clavate capsule, compressed parallel to the septum, 4-seeded; placentas dehiscing with the seeds elastically from the base. *Seeds* compressed, discoid, white-hairy when wetted.

MICRANTHUS OPPOSITIFOLIUS, Wendl. *Phaylopsis parviflora*, Willd.; F. B. I iv. 417. *Aetheilema reniforme*, Nees; Wt. Ic. t. 1533.

N. Circars, Ganjam to Godavari, in forest undergrowth, common; W. Ghâts, S. Canara to Travancore, at low levels; Shevaroy Hills.

A much-branched diffuse viscid herb with small white flowers and reniform or orbicular bracts green at first turning white and scarious with age, the leaves in unequal pairs, up to about 4 in. long and long-petioled.

16. Dyschoriste, Nees.

Perennial herbs or undershrubs. *Leaves* opposite, often shortly dentate. *Flowers* in axillary clusters or short cymes; bracts and bracteoles small. *Calyx* tubular; lobes 5, lanceolate or subulate, subequal. *Corolla* tubular, mouth obscurely 2-lipped; lobes 5, obtuse, twisted to left in bud. *Stamens* 4, didynamous; anthers similar, cells parallel, minutely mucronate or spurred at base. *Ovary* glabrous, 2-celled; ovules 2 in each cell; style linear, villous; stigma linear, recurved. *Fruit* an oblong capsule, solid at the base. *Seeds* 4, orbicular, compressed, on strong retinacula, densely white-hairy when wetted; cotyledons cordate.

Stiff woody much-branched undershrub with whitish bark; leaves small obovate, grey-canescent, under ·5 in. in diam., subsessile; flowers solitary, the calyx appressed hirsute with short acute lobes, the corolla ·75 in. long, tubular below, funnel-shaped above; anthers minutely mucronate at base ..... 1. *littoralis.*

Slender undershrubs with green branches from a woody rootstock; flowers in clusters or cymes; leaves green :—

Low plant with prostrate stems often rooting at the nodes; flowers in axillary clusters with long-acuminate nearly glabrous calyx-lobes and small funnel-shaped corolla about ·25 in. long; anthers minutely mucronate at base; leaves elliptic or obovate, ·75–1·5 in. long ..... 2. *depressa.*

Erect slender plant, subscandent, the stems often geniculate; flowers in shortly peduncled axillary cymes with long linear glandular hairy calyx-lobes and broadly tubular corolla, ·75 in. long; anthers prominently spurred at base; leaves ovate or lanceolate, acute at both ends, up to 2·5 in. long, 1·5 in. broad, long-petioled 3. *vagans.*

1. DYSCHORISTE LITTORALIS, Nees; Wt. Ic. t. 447. *Calophanes littoralis*, T. And.; F. B. I. iv. 410.

   Carnatic, chiefly along the coast on dry sand, also inland westwards to the foot of the Ghâts on arid spots.

   An undershrub with divaricate branches and rather large blue-purple flowers.

2. DYSCHORISTE DEPRESSA, Nees. *Calophanes Nagchana*, C. B. Clarke; F. B. I. iv. 410.

   Carnatic, near Madras, westwards to Salem and Coimbatore, in dry places, scarce.

   A trailing plant with small violet-pink flowers.

3. DYSCHORISTE VAGANS, O. Kze. *Calophanes vagans*, Wt. Ic. t. 1526; F. B. I. iv. 411.

   N. Circars, in Godavari; Deccan and Carnatic, in the undergrowth of deciduous forest, up to 3,000 ft. on Kambakam Drug, Ramandrúg and other hills.

   A slender diffuse plant, straggling among bushes, with blue flowers.

17. Eranthemum, Linn.

Perennial herbs or shrubs. *Leaves* opposite, petioled, entire or obscurely crenulate, very much lineolate. *Flowers* in linear, distant or close, spikes or heads; bracts usually large and prominent; bracteoles smaller, linear-lanceolate. *Calyx* 5-lobed, the lobes narrow, often scarious. *Corolla*-tube long and slender, cylindric, widened at the top, or sometimes at the middle; lobes obovate, twisted to the left in bud, spreading in flower. *Stamens* 2 perfect, with usually 2 others reduced to small staminodes, close to the bases of the filaments; anthers oblong, 2-celled.

more or less exserted. *Ovary* 2-celled; ovules 2 in each cell; style long and slender, sparsely hairy; stigma simple or slightly 2-lobed. *Fruit* a clavate capsule with solid base. *Seeds* 4, discoid, on sharp retinacula, hairy when wetted.

Bracts white with green nerves; calyx scarious :—

Bracts elliptic-ovate, cuspidate, nearly glabrous; spikes 1–3 in. long, in close panicles; lower leaves ovate, acuminate at both ends, shortly decurrent, usually up to 4 in. long, 2 in. broad, glabrous, upper many, smaller .....1. *nervosum.*

Bracts obovate, obtuse, mucronate or shortly apiculate, glandular strigose; spikes 3–6 in. long, subinterrupted, in elongate panicles, often solitary; lower leaves lanceolate or oblong-lanceolate, acuminate, long tapering and decurrent at base, up to 8 in. long, 3 in. broad, glabrous, upper smaller but fewer .....2. *roseum.*

Bracts green, rarely whitish when old :—

Bracts ovate-lanceolate, long acuminate, prominently many-nerved, white-ciliate on the margins; spikes 1–3 in. long, dense, long-peduncled, forming loose panicles; calyx scarious; lower leaves ovate acuminate, rounded at base and then decurrent, up to 8 in. long, 3·5 in. broad, nearly glabrous, but often scurfy on the nerves beneath, upper subsessile, cordate at base .....3. *purpurascens.*

Bracts lanceolate to linear, long acuminate, few-nerved, viscidly glandular-hispid; spikes 2–6 in. long, slender, often interrupted, in large very compound terminal panicles; calyx green, glandular; lower leaves elliptic, acuminate, attenuate at base or sometimes rounded, shortly decurrent, up to 5 in. long, 2 in. broad, glabrous, long-petioled, upper gradually smaller and rounded at base, subsessile.....4. *montanum.*

1. ERANTHEMUM NERVOSUM, R. Br. *Daedalacanthus nervosus*, T. And.; F. B. I. iv. 418.

Carnatic, in Tinnevelly (Wight), perhaps only in cultivation elsewhere in S. India; frequent in gardens.

A pretty shrub reaching 5 ft. in height with bright blue flowers in short bracteate spikes in large terminal panicles.

2. ERANTHEMUM ROSEUM, R. Br. *Daedalacanthus roseus*, T. And.; F. B. I. iv. 419.

W. Coast, in S. Canara (Hohenacker, Wight).

A shrub reaching 6 ft. in height with rose-coloured flowers or "blue fading to purple or red" (Cooke) in long spikes forming elongate terminal panicles.

3. ERANTHEMUM PURPURASCENS, Nees. *Daedalacanthus purpurascens*, T. And.; F. B. I. iv. 420. *Justicia pulchella* Roxb. Cor. Pl. t. 177.

N. Circars, Ganjam to Godavari, in deciduous forest under-growth, common; Deccan, Nallamalai Hills of Kurnool, hills of Cuddapah, Ramandrúg in Bellary; Shevaroy Hills of Salem.

A shrubby plant up to 4 ft. high with blue flowers in close heads.

4. ERANTHEMUM MONTANUM, Roxb.; Wt. Ic. t. 466. *Daedalacanthus montanus*, T. And.; F. B. I. iv. 421. *Justicia montana*, Roxb. Cor. Pl. t. 176.

N. Circars, Ganjam to Godavari, in deciduous forest; W. Ghâts, on E. slopes and hills of Coimbatore to S. Travancore.

A small shrub up to about 3 ft. with very pale blue flowers.

Var. *Wightianum*. Bracts very narrow, linear, up to ·6 in. long, the spikes very slender, the leaves broader.

Deccan (Russell; Wall. Cat. 2495*a*).

Var. *concanense*. Bracts much shorter, almost ovate, under ·5 in. long, the spikes slender and much interrupted.

Mysore, at Kempkull, 1,000–2,000 ft.-(Meebold).

18. Strobilanthes, Blume.

Shrubs, undershrubs or herbs, often gregarious and only flowering after a period of years and then dying off. *Leaves* opposite, often unequal, toothed or subentire, usually lineolate with raphides as are the bracts and other green parts. *Flowers* capitate or in strobilate or interrupted bracteate spikes or panicled, sessile or sometimes pedicelled, usually with 1 floral bract and 2 bracteoles. *Calyx* usually deeply 5-partite, the lobes narrow, subequal or one longer, rarely 2-lipped. *Corolla* usually white blue or purple, rather large, straight or curved, the upper part ventricose, the lower cylindric; lobes 5, rounded or ovate, twisted to the left in bud. *Stamens* 2 or, more usually, 4 didynamous; filaments monadelphous, the bases combined in a sheath more or less adherent at the middle to the corolla, the margins free; anthers oblong, muticous, 2-celled. *Disk* small or as a stalk to the ovary. *Ovary* 2-celled, ovules 2 in each cell;

style linear; stigma of one linear branch, the other suppressed or a mere point. *Fruit* a 2- or 4-seeded capsule, the placentas sometimes separating elastically. *Seeds* much compressed, glabrous or hairy on strong curved retinacula.

Stamens 2 fertile, hardly monadelphous, though sometimes connected at base :—

Seeds glabrous even when wetted, without basal areole; cylinder base of corolla long, suddenly widening :—

Flowers in elongate linear subinterrupted viscous spikes; filaments glabrous except at base, no infertile stamens or staminodes; bracts lanceolate, acuminate, up to ·5 in. long, viscous-glandular; leaves elliptic, acute or acuminate, crenulate, rugose, up to 6 in. long, 2·5 in. broad, main nerves 6–7 pairs, impressed . . 1. *humilis.*

Flowers in ovoid densely capitate heads supported by 4 leaves as outer bracts; filaments hirsute, infertile stamens or staminodes 2; bracts lanceolate, ·7 in. long, glabrous, 7-ribbed, bracteoles linear; leaves ovate, acuminate, serrulate, up to 5 in. long, 2 in. broad, main nerves about 8 pairs, slightly impressed . . 2. *foliosus.*

Seeds densely hairy when wetted, with a basal areole; cylinder base of corolla short, gradually widening :—

Flowers in dense broad spikes, not interrupted, 1–3 in. long, white-villous, supported by 2 leaves as outer bracts; bracts lanceolate, acuminate, ·7 in. long, bracteoles linear, like the calyx ·3–·5 in. long; filaments pilose; leaves elliptic-lanceolate or obovate, acute, serrate, coriaceous, scabrid above, reticulate and white-villous in the areoles beneath, up to 3 in. long, 1 in. broad, main nerves 8–10 pairs, strong, parallel . . . . . 3. *Kunthianus.*

Flowers in narrow spikes :—

Spikes short, usually under 1 in. long, clustered with the leaves in the upper axils, not interrupted, greyish villous; bracts ovate, bracteoles short, like the calyx ·25 in. long; filaments villous near the base; leaves ovate, acute, subentire, coriaceous, puberulous beneath and when young white-tomentose, up to 3 in. long, 1·5 in. broad, main nerves 8–9 pairs, curved and parallel . . . . . 4. *canaricus.*

Spikes more than 1 in. long, usually axillary or lateral, sometimes panicled :—

Spikes from the first more or less glandular hispid, not woolly, more or less interrupted :—

Spikes 1–2 in. long, often panicled, in the axils of present or fallen leaves along the stems; bracts lanceolate; bracteoles small; calyx ·5 in. long with linear lobes;

corolla ·5 in. long; leaves submembranous, ovate, long cuspidate-acuminate, crenulate, the base rounded and decurrent on the long petiole, up to 7 in. long, 4 in. broad, nerves 10–11 pairs .....5. *jeyporensis.*

Spikes 2–3 in. long, peduncled, single or in usually 3-branched very glandular panicles towards the ends of the branches; bracts lanceolate, acuminate, recurved, bracteoles short; calyx ·5 in. long, with linear lobes; corolla ·75–1 in. long, glabrous or puberulous without; leaves ovate, cuspidate-acuminate, crenulate, the base acute with long petiole, densely white-silky beneath, up to 6 in. long, 2·5 in. broad, main nerves 8–10 pairs, parallel.....6. *cuspidatus.*

Spikes 2–3 in. long, short-peduncled, very slender, single or in panicles axillary or lateral, often nearly quite glabrous; bracts ovate or lanceolate, acuminate, bracteoles linear, short; calyx ·2–·3 in. long, the lobes slender; corolla ·75 in. long, glabrous without; leaves thin, ovate, long-acuminate, dentate, the base decurrent on a long petiole, nearly or quite glabrous, up to 7 in. long, 4 in. broad, main nerves 7–8 pairs, subparallel.....7. *consanguineus.*

Spikes not glandular at any rate at first but with grey or tawny wool :—

Spikes 3–5 in. long, interrupted, covered with the fulvous or greyish appressed wool when in flower, in fruit becoming also glandular hispid, single or in panicles axillary and terminal; bracts ovate-lanceolate, glabrous within, bracteoles small, calyx-lobes acuminate, all enlarging in fruit; leaves ovate-lanceolate, long cuspidate-acuminate, covered beneath with appressed cinnamomeous or grey wool, up to 6 in. long, 2 in. broad, main nerves 9–10 pairs, parallel .....8. *Lawsoni.*

Spikes 2–3 in. long, not interrupted, covered, like the stems and the undersurface of the leaves, with soft spreading floccose tawny wool, single or in panicles; bracts ovate acute, glabrous within, bracteoles small; calyx-lobes linear, ·25 in. long; leaves ovate, acuminate with a twisted point, covered beneath with soft tawny wool, up to 5 in. long, 2·5 in. broad, main nerves 10–13 pairs, parallel, impressed .....9. *gossypinus.*

Stamens 4 fertile, usually monadelphous, the filaments combined below in a sheath more or less adherent to the corolla-tube, but the margins usually free :—

Flowers in capitate heads or short spikes :—

Seeds glabrous :—

Stems tetragonous, grooved, winged or not, the bases of the long petioles of the leaves swollen and often auricled ; leaves elliptic-lanceolate or -oblanceolate, base decurrent, crenate or subentire, glabrous, up to 8 in. long, 4 in. broad, prominently 7–8-nerved ; heads very close, 1–2 in. long, enlarged or glandular in fruit ; bracts ovate, cuspidate with recurved tips ; cylinder base of corolla as long as the campanulate upper part ; filament sheath long, ciliate like the stamens, inner pair shorter ..... 10. *barbatus.*

Stems hardly tetragonous, not winged, the leaf-petioles not auricled :—

Flowers in heads :—

Heads very hairy, short and dense but often elongating in fruit, supported by 2 or more leaf-like involucral bracts :—

Leaves rugose, usually with bulbous-based hairs, scabrous-hispid, subcoriaceous :—

Corolla with the cylinder base shorter than the urceolate upper part ; filaments and their sheaths glabrous :—

Filaments nearly equal, the 2 inner close and rather higher than the 2 divaricate outer ; thick low shrubs with lanceolate acute bracts and acuminate calyx-lobes ; leaves up to 2 in. long, 1 in. broad, with 6–8 pairs of main nerves impressed above 11. *Wightianus.*

Filaments unequal, the 2 on each side high up separated by a deep depression, sometimes a sterile fifth ; slender shrubs with obovate obtuse crenate bracts and linear obtuse calyx-lobes ; leaves up to 3 in. long, 2 in. broad, with about 6–7 pairs of main nerves impressed above ..... 12. *urceolaris.*

Corolla with the cylinder base long and slender, as long as the much curved ventricose part ; filaments long white-hairy at base :—

Heads small, flattened, densely white-hairy ; bracts leafy, suborbicular, with a broad stalk, crenate, bracteoles linear-spathulate, ·5 in. long ; leaves ovate, acute at both ends, serrate, up to 4·5 in. long, 3 in. broad, main nerves 7 pairs .. 13. *pulneyensis.*

Heads large, densely bristly hirsute :—

Bracts oblong, 1–1·5 in. long, bracteoles very

long, setaceous bristly; calyx-lobes lanceolate with scarious margins; leaves ovate, acuminate, crenate, rounded at base, up to 6 in. long, 3 in. broad, with 7–8 pairs of main nerves
14. *neilgherrensis.*

Bracts leafy, obovate, acute, crenate, very silky, bracteoles linear, very white-silky; calyx-lobes narrowly lanceolate, scarious below, silky above; leaves ovate, acute, narrowed at base, up to 4·5 in. long, 2·5 in. broad, with 5 pairs of impressed main nerves ..... 15. *circarensis.*

Leaves stem and inflorescence softly white- or fulvous-glandular hairy, the peduncles flattened; leaves membranous, ovate or lanceolate, long-acuminate, narrowed at base, up to 5 in. long, 2 in. broad; cylinder base of corolla very short, upper part ventricose; filament sheath long, the 2 inner stamens shorter and rather higher up than the outer ..... 16. *anceps.*

Heads softly rufous-hairy, elongate, clavate, on bracteate often deflexed peduncles, with small involucral bracts; cylinder base of corolla short, upper part funnel-shaped; filament sheath elongate, silky, straight, truncate at top, the stamens short; bracts membranous, ovate, ·75–1 in. long, bracteoles linear; calyx-lobes linear; leaves ovate, acuminate, rounded at base, crenate, up to 4·5 in. long, 3 in. broad, with 5–6 pairs of main nerves
17. *Perrottetianus.*

Heads erect, very harshly scabrous, with 2 pairs of leafy involucral bracts, floral bracts lanceolate, 1 in. or more long, bracteoles linear also calyx-lobes; corolla large, cylinder base ·6 in. long, upper part 1 in., the lobes large; filament sheath short, the inner stamens much shorter than the outer; leaves ovate, acute, shortly cuneate at base, callous-serrate, up to 7 in. long, 4 in. broad, the main nerves 8–9 pairs ..... 18. *papillosus.*

Flowers in spikes, glabrous except sometimes in fruit, bracts not decurrent :—

Spikes erect, oblong :—

Bracts very conspicuous, spreading, leafy, 1–2·5 in. long, glabrous in flower, glandular-hairy in fruit as are the linear-lanceolate calyx-lobes and the small bracteoles; corolla large, cylinder base ·5 in. long, upper ventricose

part ·75 in.; filament sheath short, truncate, the outer stamens the longer; leaves ovate, acuminate, cuneate at base, serrulate, up to 3 in. long, 2 in. broad, with 7–8 pairs main nerves.....19. *Zenkerianus.*

Bracts small, not conspicuous, close, glabrous or glandular-hairy, bracteoles small; calyx-lobes ·3 in. long, linear; corolla small, ·5 in. long, cylinder base as long as the campanulate upper part; filament sheath short, truncate, villous; leaves lanceolate, acuminate, narrowed and decurrent at base, serrate, up to 6 in. long, 2 in. broad, main nerves 7 pairs raised on upper surface

20. *Warreensis.*

Spikes deflexed, oblong or clavate, usually glabrous as are the leaves; seeds doubtful but apparently glabrous :—

Spikes ·5–·75 in. long; corolla small, with exsert stamens :—

Heads usually single, glabrous; bracts lanceolate, subcoriaceous; calyx-lobes lanceolate, acuminate; cylinder base of corolla ·25 in. long, slender, the upper part campanulate, spreading; filament sheath short, white-fringed; leaves glabrous, lanceolate, acuminate at both ends, serrate, up to 4·5 in. long, 1·5 in. broad, main nerves 5–6 pairs, raised above.....21. *ciliatus.*

Heads in racemes, white hairy; bracts ovate, soft, hairy, subscarious; calyx-lobes spathulate, ciliate; cylinder base of corolla ·2 in. long, upper part campanulate, longer; filament sheath long, white-hairy; leaves ovate or ovate-lanceolate, long-acuminate at both ends, crenate, up to 5 in. long, 2 in. broad, main nerves 6 pairs .....22. *Meeboldii.*

Spikes 75–1·5 in. long; corolla large with included stamens, cylinder base ·25 in. long, upper part funnel-shaped, ·75 in. long; filament sheath ·2 in. long, sparsely hairy, the inner stamens shorter; leaves narrowly lanceolate, acuminate at both ends, subentire, glabrous, up to 6 in. long, 1–1·25 in. broad, main nerves 6 pairs, faint

23. *adenophorus.*

Flowers in erect or rarely deflexed spikes with 2 small involucral bracts, floral bracts large, membranous, elliptic, decurrent, prominently nerved in fruit; calyx-lobes lanceolate, ·3 in. long, subscarious; corolla with cylinder base short, upper part ventricose; filament sheath elongate, ·4 in. long, fringed,

truncate, the stamens short ; leaves lanceolate, acuminate, membranous, up to 7 in. long, 2·5 in. broad, main nerves 10 pairs ..... 24. *decurrens.*

Flowers in large oblong deflexed spikes elongating in fruit, with 2 pairs of oblong involucral bracts a little below ; floral bracts lanceolate, acuminate, ·5 in. long ; cylinder base of corolla very short, upper part campanulate with short recurved lobes ; filament sheath broad, glabrous, the stamens all equal and long-exsert ; leaves thin, ovate, acuminate, broad but suddenly decurrent at base, sparsely pubescent, up to 9 in. long, 4·5 in. broad, main nerves 10–11 pairs

25. *micranthus.*

Seeds hairy :—

Seeds appressed villous, the hairs not elastic when wetted ; capsule 2-seeded : —

Seeds oblong with large areoles ; flowers in panicles of deflexed lanceolate 2–3-flowered heads about ·75 in. long, with 2 pairs involucral bracts ; bracts lanceolate, long-acuminate, ciliate, bracteoles 0 or minute ; corolla 1 in. long, cylinder base short ; leaves elliptic, long-acuminate at both ends, crenate, up to 7 in. long, 2·5 in. broad, main nerves 6 pairs

26. *tristis.*

Seeds elliptic with small areoles ; flowers in heads, single or 1-3 together, many-flowered, up to 1 in. long, very villous, with small involucral bracts ; bracts linear-oblong, obtuse, 1 in. long or less, bracteoles smaller, narrow ; corolla ·75–1 in. long, cylinder base short ; leaves lanceolate, long-caudate-acuminate, tawny pubescent beneath, up to 6 in. long, 1·25 in. broad, main nerves 10–12 pairs.... 27. *caudatus.*

Seeds glabrous on the faces, the ring margin with elastic hairs when wetted :—

Seeds not areolate ; stem and leaves scabrous-hirsute ; heads short and close, in trichotomous panicles with a pair of spathulate involucral leaves ; bracts oblong, ·75 in. long, fulvous-hairy, bracteoles nearly as long, linear ; calyx-lobes ·6 in. long ; corolla with cylinder base ·4 in. long, ventricose upper part ·6 in. ; leaves ovate, acuminate, round and suddenly decurrent at base, rugose, serrate, up to 7 in. long, 5 in. broad, main nerves about 8 pairs, impressed

28. *heteromallus.*

Seeds areolate ; stem and leaves slightly hairy ; heads somewhat elongate, solitary or in terminal or axillary cymes with

1 or more small leaves on the peduncles; bracts ovate, viscous, scarious in fruit, bracteoles short, spathulate; corolla with cylinder base ·2 in. long, ventricose upper part ·5 in.; leaves elliptic-lanceolate, acuminate, cuneate at base, crenate, membranous, up to 6 in. long, 2 in. broad, main nerves 8–10 pairs .....29. *ixiocephalus.*

Seeds elastically hairy when wetted, both on face and margin, except the areole; spikes 1–1·5 in. long in flower, 2–3 in. in fruit, in close panicles bracteate at the nodes; bracts ovate, acute, decurrent on a thick stalk, reddish-glandular-hairy; bracteoles linear, ·2–·3 in.; corolla with cylinder base ·3 in. long, ventricose upper part ·5 in., hairy without; leaves variable, elliptic, acuminate, decurrent at base, crenate, membranous, with shining white hairs, up to 6 in. long, 3 in. broad, often smaller, long-petioled, main nerves 7–10 pairs.....30. *asper.*

Flowers in strobilate often cymose spikes or heads, the bracts usually rounded and concave :—

Seeds glabrous (those of *S. Andersonii* not known) :—

Flowers on the branches, axillary or lateral, the spikes with small bracts in pairs below, the first floral bracts usually flowerless :—

Bracteoles 0; sheath of filaments long, narrow, very hairy, inner stamens shorter :—

Bracts elliptic-obovate, obtuse, softly long-glandular-hairy, reticulate, narrowed at base; calyx-lobes oblong, obtuse or emarginate, scarious, ·3 in. long; corolla ·75–1 in. long, cylinder base as long as the urceolate upper part; leaves elliptic-ovate, acuminate, slightly decurrent, serrate, rugose, up to 6 in. long, 3 in. broad, main nerves about 9 pairs 31. *lupulinus.*

Bracts not glandular hairy, elliptic or orbicular, obtuse or emarginate, usually white or pink; calyx subscarious, lobes emarginate :—

Bracts not decurrent on the rhachis of the spike; filament sheath elongate :—

Leaves thick, broadly elliptic, rugose and often bullate, scabrous with bulbous-based hairs above, white-strigose beneath, up to ·5 in. long, 2·5 in. broad; main nerves 8–10 pairs, much impressed as are the subparallel transverse nervules; corolla ·75 in. long, cylinder base very short .....32. *asperrimus.*

Leaves thin, ovate or elliptic, acuminate, with a few

scattered bulbous-based hairs above and many soft white hairs on both sides, up to 6 in. long, 3 in. broad, main nerves 6–8 pairs, raised, the transverse nervules inconspicuous; spikes in short, usually trichotomous cymes; corolla ·75 in. long, without cylinder base
33. *Heyneanus.*

Upper bracts of each spike decurrent on the rhachis; filament sheath shorter and curved; leaves ovate, subacute, obtuse or subcordate at base, softly villous, up to 1·5 in. long, 1 in. broad, main nerves 4–5 pairs, not prominent; spikes subglobose, solitary or few together, the small peduncle bracts obovate, deflexed; corolla about ·5 in. long, campanulate, no cylinder base
34. *campanulatus.*

Bracteoles linear-oblong; sheath of filaments short, glabrous; stamens subequal; bracts suborbicular, glabrous; calyx-lobes linear-oblong, acute; corolla 1·25 in. long, the cylinder base very short; leaves ovate, acuminate, rounded or subcordate at base, crenulate, loosely villous, up to 7 in. long, 4 in. broad, main nerves 7–8 pairs .....35. *Andersonii.*

Flowers from the old wood, often from near the ground, sometimes also terminal; stamens equal, united by pairs in a short sheath at the base:—

Bracts large, blackish-purple, orbicular, entire, glabrous or glandular-pubescent, ·75 in. in diam., bracteoles ligulate, 1 in. long, scabrous; corolla somewhat bilabiate, the lobes reflexed, cylinder base very short; leaves ovate, caudate-acuminate, crenulate, up to 10 in. long, 5 in. broad, main nerves about 8 pairs.....36. *luridus.*

Bracts large, orbicular, serrate, softly hairy but later glabrate, 1–2 in. in diam., prominently nerved, bracteoles oblong, ·75 in. long, ciliate; corolla subcampanulate with broad lobes; leaves ovate, acuminate, serrulate, sparsely glandular-hairy, up to 9 in. long, 4 in. broad, main nerves 9 pairs .....37. *bolampattianus.*

Seeds hairy when wet, except on the areoles; bracteoles 0:—

Spikes cylindric, axillary and terminal, 1–3 in. long; bracts ovate, acute or cuspidate, softly hairy; corolla 1 in. long, the cylinder base ·25 in.; filament sheath straight, outer anthers larger than inner; leaves ovate, acute, subcordate at base, crenate, rugose or bullate, very softly glandular-hairy, up to 1·5 in. long, ·75–1 in. broad, main nerves 6–7 pairs 38. *sessilis.*

Spikes subtetragonous, lateral and terminal, 2·5 in. long; bracts ovate, obtuse, reddish, viscous, subscarious, decurrent at base, ·75 in. long; calyx-lobes scarious; corolla large; leaves ovate, acuminate, subcordate, crenate, bristly-pubescent, up to 5 in. long, 3 in. broad, main nerves 9 pairs....39. *Dupeni.*

Flowers in lax spikes, cymose or panicled; bracts in pairs at the nodes of the panicle-branches; no floral bracts:—

Bracts early deciduous, ·3 in. long, bracteoles smaller, calyx-lobes ·5 in. long, linear-oblong, obtuse, all glandular-hairy; spikes in panicles much interrupted; corolla 1–1·5 in. long, of which cylinder base about one-third; leaves ovate, acute, rounded or cordate at base, serrate, scabrous and glandular, up to 2 in. long, main nerves about 5 pairs .....40. *Newii.*

Bracts persistent:—

Spikes axillary, solitary or in cymes, covered with long soft viscid glandular hairs; bracts linear, acuminate, recurved, ·5–·75 in. long, bracteoles smaller; calyx-lobes linear, unequal, ·3–·5 in. long, longer in fruit; corolla 1–1·25 in. long., the cylinder base about one-third; filament sheath elongate, villous as are the outer filaments, the inner ones shorter; leaves lanceolate, long acuminate, decurrent on the petiole and then auricled, nearly entire, up to 12 or even more in. long, 3 in. broad, main nerves 6–10 pairs; seeds 2, very shaggy with white hairs

41. *integrifolius.*

Spikes in terminal more or less leafy panicles; seeds 4, hairy:—

Leaves oblong lanceolate, sessile or petioled with the blade decurrent and ending in an auricle:—

Spikes rather stout, flexuose, with the internodes ·5–1 in. long, nodal bracts large, ovate, acute, ·5 in. long, bracteoles spathulate; calyx ·5 in. long, the lobes linear; corolla 1 in., curved, cylinder tube hardly any; leaves elliptic or lanceolate, long acuminate, serrate, up to 8 in. long, 1·5 in. or more broad, main nerves 8–10 pairs, very oblique

42. *homotropus.*

Spikes slender, flexuose, puberulous, the internodes ·25–·5 in. long, nodal bracts small, oblong, usually under ·25 in. long, bracteoles linear, short, glandular hairy; calyx ·25–·35 in. long, the lobes linear, glabrous; corolla 1 in. long, curved, the cylinder tube rather short; leaves lanceolate, long acuminate, the petiole broadly winged and auricled, serrate, up to 12 in. long, 3·5 in. broad, main nerves 8–12 pairs, very oblique, regular.....43. *gracilis.*

Leaves ovate, acute, abruptly rounded at base and then shortly decurrent on the long petiole, crenulate, glandular-pubescent, the blade up to 6·5 in. long, 4 in. broad, main nerves 10–15 pairs, spreading and prominent; spikes in glandular-pubescent panicles, the nodal bracts oblong, about ·2 in. long, bracteoles linear, more hairy than the obtuse calyx-lobes; corolla 1·25 in. long, urceolate, very retrorsely hairy within, cylinder base small; filament sheath curved at base, the inner stamens short .....44. *violaceus.*

Leaves not auricled and not decurrent on the long petiole :—

Stout and very viscous glandular-hairy, the leaves elliptic or oblanceolate, acuminate at both ends, glabrous, undulate, crenate, long-petioled, up to 7 in. long, 3 in. broad, main nerves 10 pairs, prominent, curved; panicles large and loose, very sticky, nodal bracts small, linear; pedicels slender, bracteoles minute, ·1 in. long; calyx very glandular-villous, the lobes linear ·5 in., one longer; corolla large, ventricose, no cylinder base, 1–1·5 in. long; capsule glabrous, apiculate.....45. *amabilis.*

Slender and with only a few long white glandular hairs, the leaves lanceolate, caudate-acuminate, nearly glabrous, undulate, petioled, up to 5 in. long, 1·25 in. broad, main nerves 7–9 pairs, curved; panicles much branched, nodal bracts ovate acute, spreading or reflexed; pedicels slender, bracteoles very minute; calyx subglabrous, the lobes linear ·25 in., one longer; corolla funnel-shaped, ·75–1 in., cylinder base very short; capsule oblanceolate

46. *rubicundus.*

1. STROBILANTHES HUMILIS, Gamble n. comb. *Endopogon viscosus*, var. *humilis*; Wt. Ic. t. 1498.

W. Ghâts, Anamalai Hills, at 4,300 ft. (Beddome, No. 69 in Herb. Calc)., Courtallum, in Tinnevelly (Wight).

A low shrub scarcely a foot high (Wight). Beddome's specimen was collected in 1858, Wight's in 1836.

2. STROBILANTHES FOLIOSUS, T. And.; F. B. I. iv. 433. *Endopogon foliosus*, Wt. Ic. t. 1501. *E. capitatus*, Wt. Ic. t. 1499.

W. Ghâts. Nilgiri and Pulney Hills, at 4,000–7,000 ft. in Shola Forest, common; Sholas on Kudramukh, S. Canara (Beddome); Brumagiri Hills (Fischer).

A large, gregarious shrub with pale blue flowers, the stems

glabrous or glandular pilose, both often on the same plant, the hairy ones usually in the fruiting season. The leafy outer bracts are often deciduous, when the long linear bracteoles and calyx-lobes are conspicuous. It is often found in flower and perhaps does not die down at intervals.

3. STROBILANTHES KUNTHIANUS, T. And.; F. B. I. iv 434. *Phlebophyllum Kunthianum*, Nees; Wt. Ic. t. 448.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 6,000 ft., on grassy downs, common, especially in Nilgiris on the E. side; Shevaroy Hills and hills of N. Coimbatore.

A gregarious bushy shrub with blue flowers, colouring large tracts when in flower, probably at intervals of about 6 years.

4. STROBILANTHES CANARICUS, Bedd. Ic. t. 215; F. B. I. iv. 434.

W. Ghâts, hills of S. Canara at Kudramukh 6,000 ft. (Beddome).

A stiff shrub reaching 3–4 ft. in height, with white flowers, the corolla ·5 in. long, villous without.

5. STROBILANTHES JEYPORENSIS, Bedd. Ic. t. 214; F. B. I. iv. 436.

N. Circars, hills of Vizagapatam and Godavari, at 1,500–2,500 ft. in forest undergrowth (Beddome, Gamble, Barber).

A large shrub with white flowers. It flowered in 1874, 1885 and 1902.

6. STROBILANTHES CUSPIDATUS, T. And.; F. B. I. iv. 435; Bedd. Ic. t. 221. *Endopogon versicolor*, Wt. Ic. t. 1497.

N. Circars, hills of Godavari at 3,000 ft. (Gamble); W. Ghâts, in almost all Districts, but most common in Nilgiris on N. and E. slopes about 4,000–7,000 ft.

A large shrub with appressed white-woolly or somewhat tawny young branches and the undersurface of the leaves, mature more glabrous. The flowers are of a very pale blue and the spikes very glandular hairy. It was collected in flower in 1851, 1870, 1877, 1884. Its period seems to be about 7 years.

7. STROBILANTHES CONSANGUINEUS, C. B. Clarke; F. B. I. iv. 435.

W. Ghâts on N. and E. slopes of Nilgiris and Pulneys, at low levels.

A large shrub, with pale blue or white flowers, the spikes glandular villous, the bracts rather short. It was collected in flower in 1884. 1897, 1909, and its period may be about 12 years.

Var. *Amomum*, C. B. Clarke; Bedd. Ic. t. 216. Spikes more slender, more interrupted, nearly glabrous; leaves more prominently toothed; bracts larger, acuminate.

Carnatic, Kambakam Hills of Chingleput (Fischer); W. Ghâts, Mysore and Coimbatore to the Pulneys.

Var. *hypoleucus*, C. B. Clarke. Spikes as in var. *Amomum* but the leaves more or less covered beneath with appressed white tomentum.

Hills of the Deccan, Ramandrúg in Bellary (Beddome).

8 STROBILANTHES LAWSONI, Gamble in Kew Bull. 1923, 374.

W. Ghâts, below Sispara in W. Nilgiris, at 5,000–6,000 ft. (Lawson, Gamble) in sheltered sholas; Tambracheri Ghât, Wynaad (Barber); hills of Travancore, among rocks (Bourdillon).

An erect shrub with pale blue flowers. It was collected in flower in 1883. The capsules and seeds are large and the latter very hairy when wetted.

9. STROBILANTHES GOSSYPINUS, T. And.; F. B. I. iv. 434; Bedd. Ic. t. 198; Bot. Mag. t. 7790.

W. Ghâts, above Sispara in W. Nilgiris, at 7,000 ft., on open dry hillsides; Mysore? (*Lobb.*).

A handsome erect shrub with pale blue flowers. It flowered in 1867 to 1870 and 1883 and its period is supposed to be 6 or 7 years (Beddome).

10. STROBILANTHES BARBATUS, Nees; F. B. I. iv. 437; Bedd. Ic. t. 212. *S. tetrapterus*, Dalz.

W. Ghâts, Bababudan Hills (Talbot), W. Nilgiris, Anamalais and hills of Travancore, at low levels and up to 3,000 ft.

A gregarious shrub with white flowers, flowering about every 7th year (Beddome).

11. STROBILANTHES WIGHTIANUS, Nees; F. B. I. iv. 438; Wt. Ic. t. 1514.

W. Ghâts, Nilgiris above 6,000 ft., usually on grassy downs, common.

A very rough rather low gregarious shrub with pale blue flowers marked with darker veins, the tube brownish. It may be found in flower in any year.

12. STROBILANTHES URCEOLARIS, Gamble in Kew Bull. 1923, 374.

W. Ghâts, Nilgiris about Ootacamund, 7,000–8,000 ft. (Bourne, Gamble). Pulney Hills, head of the Bodinaikanur Ghât (Beddome), in Shola forest, on grass land.

An erect shrub with long internodes in the forest, a very low branching one in open places, the flowers apparently pale blue.

13. STROBILANTHES PULNEYENSIS, C. B. Clarke; F. B. I. iv. 438.

W. Ghâts, Coorg, Nilgiris, Anamalais, Pulneys and hills of Travancore above 5,000 ft.; hills of N. Coimbatore at 5,000 ft. (Fischer); Shevaroy Hills of Salem (Bourne).

A shrub with blue flowers. It seems to have been found in flower at rather long intervals. It flowered at Cairn Hill, Octacamund, in 1885.

14. STROBILANTHES NEILGHERRENSIS, Bedd. Ic. t. 196; F. B. I. iv. 438.

W. Ghâts, Coorg Wynaad, Palghât and Pulney Hills, at 3,000–6,000 ft., in evergreen forests.

A large shrub with subtetragonal stems and white flowers. It was found in flower in 1884 (Gamble), 1910 (Fischer), previously by Beddome without date.

15. STROBILANTHES CIRCARENSIS, Gamble in Kew Bull. 1923, 373.

N. Circars, hills of Vizagapatam at 2,000–5,000 ft. (Gamble, A. W. Lushington).

An erect shrub with subtetragonous nearly glabrous stems, rather large capsules and glabrous seeds.

16. STROBILANTHES ANCEPS, Nees; F. B. I. iv. 442; Bedd. Ic. t. 204.

Var. *microstachya*, C. B. Clarke. *Ruellia? punctata*, Nees; Wt. Ic. t. 1563.

W. Ghâts, hills of S. Canara (Beddome); also Carcoor Ghât in Wynaad; hills of Tinnevelly, about Courtallum (Wight) and Naterikal (Hb. Madr.).

A soft slender undershrub with white flowers and glabrous seeds without areoles.

17. STROBILANTHES PERROTTETIANUS, Nees; F. B. I. iv. 439; Wt. Ic. t. 1513.

W. Ghâts, Nilgiris, in Shola woods above 6,000 ft., common; Anamalais (Beddome).

A large shrub soft with reddish-purple hairs, the flowers pale blue pink or lilac, the capsule 2-seeded. It was in flower in 1852, again in 1883–1886, since then in 1908 and 1918, but its period is uncertain, it may be 10 years.

18. STROBILANTHES PAPILLOSUS, T. And.; F. B. I. iv. 445; Bedd. Ic. t. 201.

W. Ghâts, Shola woods of Nilgiris at 7,000–8,000 ft.

A large shrub with large blue flowers, and angular stems which like the leaves and inflorescence are very scabrous with bulbous-based hairs. The close heads have involucral bracts with leafy tips. The seeds are believed to be glabrous and large, without areoles. It flowered at Sispara and on Doddabetta in 1883.

19. STROBILANTHES ZENKERIANUS, T. And.; F. B. I. iv. 439; *Endopogon Strobilanthes*, Wt. Ic. t. 1500.

W. Ghâts, Nilgiris, in Shola woods above 6,000 ft., common; Anamalais, at 6,000 ft. (Beddome); Pulney Hills, (Bourne).

A large handsome shrub, with blue flowers and 4-seeded capsule. It was in flower in 1883–85 and again in 1916, but its period, perhaps rather long, is doubtful.

20. STROBILANTHES WARREENSIS, Dalz.; F. B. I. iv. 439. *S. parviflorus*, Bedd. Ic. t. 197.

S. Canara Ghâts (Beddome, Meebold); Coorg, at 3,000 ft. (*fide* Beddome).

An erect shrub 5–6 ft. high with white flowers in slender cottony spikes, capsule 4-seeded.

21. STROBILANTHES CILIATUS, Nees; F. B. I. iv. 439; Bedd. Ic. t. 211.

W. Ghâts, S. Canara to Travancore, in evergreen forest up to about 4,000 ft.

A slender shrub reaching 4 ft. in height with white or lilac flowers, said to flower yearly.

22. STROBILANTHES MEEBOLDII, Craib in Kew Bull. 1910, 278.

Deccan, Kempkull in Mysore, at 1,000 ft. (Meebold).

A small shrub about 3 ft. high, the heads small somewhat

strobilate with soft subscarious bracts, the seeds not known but the ovules glabrous.

23. STROBILANTHES ADENOPHORUS, Bedd. Ic. t. 225; F. B. I. iv. 440.

W. Ghâts, Anamalai Hills, at 4,000–5,000 ft. (Beddome, Fischer), hills of Tinnevelly (Beddome).

A shrub, reaching 3–4 ft. in height, with apparently pale blue flowers and very narrow leaves, probably flowering yearly.

24. STROBILANTHES DECURRENS, Nees; F. B. I. iv. 440. *Goldfussia decurrens*, Wt. Ic. t. 1522.

W. Ghâts, Coorg (Beddome), Anamalai Hills at 4,500 ft. (Beddome), hills of Tinnevelly (Wight).

A herbaceous (Wight) plant with quadrangular stems. The large decurrent bracts and the very large seeds sometimes nearly ·5 in. in diam. are characteristic.

25. STROBILANTHES MICRANTHUS, Wt. Ic. t. 1519; F. B. I. iv. 444.

W. Ghâts, Nilgiri and Pulney Hills above 6,000 ft., in Shola woods.

An erect almost herbaceous soft shrub with thick branches, large leaves and very distinct corolla (Clarke suggests "reddish") and stamens. It flowered in 1870 and again in 1885 and 1917; the period may possibly be 15 years.

26. STROBILANTHES TRISTIS, T. And.; F. B. I. iv. 441. *Goldfussia tristis*, Wt. Ic. t. 1508.

W. Ghâts, W. Nilgiris, Anamalais and hills of Tinnevelly below 6,000 ft. in evergreen forest.

An erect shrub with pale blue flowers.

27. STROBILANTHES CAUDATUS, T. And.; F. B. I. iv. 441; Bedd. Ic. t. 213.

W. Ghâts, hills of S. Canara, Coorg, Wynaad and Travancore, up to 6,000 ft., in evergreen forest.

An erect shrub, reaching 4–5 ft. high, the flowers white tinged with orange or red. The bracts in the Malabar and Travancore specimens are longer and more spreading than in those from S. Canara.

28. STROBILANTHES HETEROMALLUS, T. And.; F. B. I. iv. 437.

W. Ghâts, Nilgiri and Pulney Hills, at about 4,000 ft. and above it.

A large shrub, reaching perhaps to 20 ft. high, with pale blue flowers, very scabrous. It was found in flower in 1884–6 (Lawson and Gamble), 1899 (Prain), 1910 (Meebold) in Nilgiris, in 1898 in Pulneys (Bourne). Its period may perhaps be about 14 years.

29. STROBILANTHES IXIOCEPHALUS, Benth.; F. B. I. iv. 444; Bedd. Ic. t. 203. *S. Neesianus*, Wt. Ic. t. 1523.

W. Coast and W. Ghâts, in S. Canara (Beddome, Hohenacker).

A small straggling shrub with white flowers and very viscid bracts.

30. STROBILANTHES ASPER, Wt. Ic. t. 1518; F. B. I. iv. 452.

W. Ghâts, Bababudan Hills of Mysore, W. Nilgiris, Anamalais, hills of Malabar, Cochin and Travancore, at 5,000–8,000 ft., margins of Shola woods.

A soft erect shrub about 4–5 ft. high with purplish-white flowers and a strong scent. Its period is possibly quite a short one and perhaps it may not die down at intervals.

31. STROBILANTHES LUPULINUS, Nees; F. B. I. iv. 443.

Hills of Mysore, at Aglatti, 3,500 ft. (Meebold); High Wavy Mountain, Madura, 4,000 ft. (Blatter and Hallberg); hills of Travancore and Tinnevelly (Wight, Rama Row).

An erect herbaceous undershrub with very glandular-hairy spikes.

32. STROBILANTHES ASPERRIMUS, Nees; F. B. I. iv. 443.

W. Ghâts, forests of Mysore, North Coimbatore and Wynaad, at about 3,000–5,000 ft.

A rather stout shrub about 3 ft. high, with apparently pale blue corolla and very rough scabrous glandular branches.

33. STROBILANTHES HEYNEANUS, Nees; F. B. I. iv. 443. *S. rugosus*, Wt. Ic. t. 1619.

W. Ghâts, in all Districts from S. Canara to Tinnevelly, at about 3,000–4,000 ft., in evergreen forests; Bababudan Hills of Mysore.

A small gregarious shrub reaching 3 ft. in height but usually less, with pale blue flowers. It seems to remain perennial and is often found in flower. It is most variable but the varieties are very difficult to separate. Clarke's var. *fusca* has large usually solitary spikes; his var. *viridis* has the cymes more elongate, more prominently bracteate

and the spikes smaller, but they run into one another and the difference seems to be really only climatic.

34. STROBILANTHES CAMPANULATUS, Wt. Ic. t. 1562. *S. Heyneanus* var. *campanulata*, C. B. Clarke; F. B. I. iv. 444.

W. Ghâts, in Coorg (Wight).

A very small herbaceous shrub reaching scarcely 10 in. high with small spikes and leaves.

35. STROBILANTHES ANDERSONII, Bedd. Ic. t. 208; F. B. I. iv. 450.

W. Ghâts, Anamalai Hills, at 6,000 ft. (Beddome), in moist woods.

A very large shrub up to 20 ft. high (Beddome), with pale blue large flowers in strobilate spikes 2–2·5 in. long, the leaves membranous.

36. STROBILANTHES LURIDUS. Wt. Ic. t. 1515–6; F. B. I. iv. 450.

W. Ghâts, W. Nilgiris from Naduvatam to Sispara at 4,000–6,000 ft., hills of Travancore at 4,000 ft. (Beddome).

A large straggling gregarious shrub with thick stems and branches, the lurid purple (sometimes white) flowers in bracteate spikes up to 10 in. long with peduncles deflexed, the spikes erect. Mr. Clarke says it flowers every year and I think this is the case, but Wight says it seems only to flower once in several years.

Var. *Bourneae*, Gamble. Bracts, bracteoles and calyx very glandular hairy, the prominent nerves on the bracts resembling those of the next species.

Pulney Hills, in Periya Shola (Bourne).

37. STROBILANTHES BOLAMPATTIANUS, Bedd. Ic. t. 200; F. B. I. iv. 451.

W. Ghâts, Bolampatti Hills of Coimbatore, at 4,500–7,000 ft., in moist forests.

A large shrub up to 15 ft. high with brown flowers in terminal or lateral spikes up to 6 in. long, sometimes panicled. Beddome says it flowers every year.

38. STROBILANTHES SESSILIS, Nees: F. B. I. iv. 452; Wt. Ic. t. 1511.

W. Ghâts, downs of W. Nilgiris at 6,000–8,000 ft.

A small erect plant with stems 1–1½ ft. high from a perennial rootstock. The flowers are a bright blue-

purple, and the bracts after flowering sometimes change to pale pink. It probably flowers almost every year or at any rate at short intervals, the rootstock remaining.

Var. ***sessiloides***, C. B. Clarke; Wt. Ic. t. 1512. Leaves thicker, very rugose or bullate, with prominent nerves; the spikes longer.

Bababudan Hills of Mysore, at 6,000 ft. (Talbot, etc.). Nilgiris (Wight).

39. STROBILANTHES DUPENI, Bedd.; F. B. I. iv. 453.

W. Ghâts, Anamalais, top of Neliampatti Ghât (Beddome).

A very little known shrub with well-marked bracts and blue flowers.

40. STROBILANTHES NEWII, Bedd. ex C. B. Clarke; F. B. I. 464. *S. extensus*, Bedd. Ic. t. 202, *not of* Nees.

W. Ghâts, Manjerabad in W. Mysore (New).

A small shrub with quadrangular stems and deep purple flowers, with much inflated corolla, the leaves prominently serrate.

41. STROBILANTHES INTEGRIFOLIUS, O. Kze. *S. perfoliatus*, T. And.; F. B. I. iv. 458. *Leptacanthus alatus*, Wt. Ic. t. 1527.

W. Ghâts, hills of S. Canara and Coorg.

A gregarious much-branched shrub up to about 4 ft. high, very viscid, with blue flowers and seeds very hairy when wetted. In the Bombay forests, it is said to flower at intervals of 7 years (Talbot). It flowered in S. Canara in 1866 (Beddome).

42. STROBILANTHES HOMOTROPUS, Nees; F. B. I. iv. 474. *S. sexennis*, Bedd. Ic. t. 206, *not of* Nees.

W. Ghâts, Nilgiris, in Sholas above 7,000 ft.

A large shrub with white flowers. It was in flower in 1883, but its period is probably a long one, as it has only rarely been collected.

43. STROBILANTHES GRACILIS, Bedd. Ic. t. 207; F. B. I. iv. 474.

W. Ghâts, Anamalais, Pulneys and hills of Travancore, at 4,000–6,000 ft.

A very large shrub (Beddome), reaching 15 ft. in height (Bourne), the flowers white tinged with lilac; mauve-blue (Bourne).

44. STROBILANTHES VIOLACEUS, Bedd. Ic. t. 205; F. B. I. iv. 474.

W. Ghâts, about Bangi Tappal and Sispara in the Nilgiris at 6,000–7,500 ft.

A large shrub with beautiful blue-purple flowers. It flowers rarely, probably at long intervals. It was found by Beddome in 1870 and by Lawson and Gamble in 1883, so the period may be 13 years.

45. STROBILANTHES AMABILIS, C. B. Clarke; F. B. I. iv. 476. *Leptacanthus Walkeri*, Wt. Ic. t. 1507, *not of* Nees.

A large very sticky shrub with jointed stems and pink flowers. Recorded flowering years are: 1838 (Gough), 1846 (Wt.), 1847 (Gardner), 1855 (Cleghorn), 1861 (T. Anderson), 1873 (Beddome), 1883 (Lawson, Gamble), 1911 (Fischer); the period has been supposed to be about 10 years.

46. STROBILANTHES RUBICUNDUS, T. And.: F. B. I. iv. 475. *S. paniculatus*, Bedd. Ic. t. 199, *not of* T. And.

W. Ghâts, Wynaad to Travancore and Tinnevelly Hills, at 2,000–3,000 ft. (Beddome, Lawson, Bourdillon).

A slender delicate shrub with pink flowers. It flowered in Wynaad in 1816 (Heyne), on the Carcoor Ghât in 1864 and 1888, near Peermerd in 1889, in Tinnevelly in 1899.

19. Calacanthus, T. And.

An erect shrub. *Leaves* large, entire, lineolate. *Flowers* large, solitary and sessile in the axils of bracts, arranged in long spikes, terminal and from the upper axils; bracteoles 2. *Calyx* 5-partite, the lobes unequal, the upper and 2 lower lanceolate, the 2 lateral linear. *Corolla* purple, deeply 2-lipped; upper lip narrow, shortly bifid, lower shortly 3-lobed, the lobes all contorted in bud. *Stamens* 4, didynamous; filaments connate at base in a transverse membrane; anthers subequal, oblong, 2-celled, ciliate. *Ovary* 2-celled; ovules 2 in each cell; style long, filiform, hairy; stigma linear. *Capsule* obovoid, compressed, apiculate, pubescent, 2-seeded. *Seeds* compressed, densely hairy, on curved retinacula.

CALACANTHUS DALZELLIANA, T. And.; F. B. I. iv. 479. *Lepidagathis grandiflora*, Dalz.; Bedd. Ic. t. 226.

Hills of S. Canara up to 3,000 ft. (Beddome).

A leafy gregarious shrub up to 6 ft. high, with large elliptic or lanceolate acuminate leaves up to 8 in. long, 3 in. broad, large purple flowers with transversely plicate lower lip and large capsule, the seeds with brown hairs.

20. Andrographis, Wall.

Erect or procumbent herbs or undershrubs, the branches often tetragonous. *Leaves* entire, often minutely lineolate. *Flowers* in axillary and terminal, lax, often panicled, racemes, sometimes reduced to 1 flower, often unilateral; bracts small; bracteoles minute or 0. *Calyx* 5-partite, the lobes narrow. *Corolla* small, usually pale but blotched and spotted with brown and purple, tubular at base, then more or less ventricose, prominently 2-lipped, the upper slightly 2-fid, the lower usually deflexed, 3-lobed and coloured. *Stamens* 2; filaments broad, enlarged at base and sometimes in the middle; anthers 2-celled, usually bearded at base with a tuft of white hair. *Ovary* 2-celled, ovules 2–6 in each cell; style slender; stigma minutely bifid. *Fruit* an oblong or elliptic capsule compressed at right angles to the septum, 4–12-seeded, the retinacula acute or rounded. Seeds hard, deeply rugosely pitted, glabrous.

Capsule linear-oblong :—

Flowers in elongate racemes, sometimes subpaniculate but the flowers distant; stem tetragonous; retinacula acute :—

Anthers bearded at the base, the filaments also more or less hirsute; corolla prominently 2-lipped :—

Corolla under ·5 in. long; anthers prominently bearded; leaves glabrous :—

Leaves lanceolate, acute at both ends, up to 3 in. long, ·75 in. broad; pedicels up to ·25 in. long; calyx-lobes glandular-pubescent ..... 1. *paniculata.*

Leaves linear, under 1 in. long; pedicels ·15 in. long; calyx-lobes glabrous, lineolate ..... 2. *stenophylla.*

Corolla about ·75 in. long; anthers bearded but not prominently :—

Stems slender as are the racemes; pedicels up to ·2 in. long; leaves lanceolate, acuminate, broadest at the rounded base, nearly glabrous, up to 3 in. long, 1 in. broad; calyx-lobes glandular-pubescent and lineolate ..... 3. *Wightiana.*

Stems stouter as are the racemes; pedicels 0–·1 in. long;

leaves oblong-lanceolate, acute, cuneate at base, slightly pubescent, up to 3·5 in. long, 1 in. broad, calyx-lobes glandular-pubescent .....4. *macrobotrys.*

Anthers not bearded at the base, the filaments nearly glabrous; corolla not or only obscurely 2-lipped :—

Corolla about ·3 in. long :—

Filaments only slightly broadened below; pedicels very short or 0; leaves ovate, acute, rounded and then decurrent at base, up to 4·5 in. long, 2 in. broad; calyx-lobes glandular-pubescent or nearly glabrous.....5. *elongata.*

Filaments with a prominent rounded protuberance; pedicels usually 0; leaves ovate, acute, attenuate or rounded and then long-decurrent at base, up to 4 in. long, 1·5 in. broad; calyx-lobes glandular-pubescent .....6. *ovata.*

Corolla ·5–·75 in. long; filaments flattened; pedicels ·1–·25 in. long; leaves below ovate, upper linear-oblong, acute at both ends, glabrous but much lineolate, up to 3·5 in. long, 1 in. broad; calyx-lobes long, glandular-hispid.....7. *alata.*

Flowers in racemes, paniculate, the flowers not very distant :—

Racemes short, forming terminal subcapitate panicles; corolla ventricose :—

Leaves elliptic, acute at both ends, glabrous except for scattered jointed hairs, drying black, up to 4 in. long, 2·5 in. broad, raphides minute; calyx-lobes linear, ·1–·15 in. long; capsule up to 1 in. long, glandular-strigose.....8. *Neesiana.*

Leaves elliptic-lanceolate, narrowed at both ends, strigose above, softly fulvous-tomentose beneath, up to 2·5 in. long, 1 in. broad, raphides 0; calyx-lobes setaceous, ·2–·3 in. long; capsule about ·75 in. long, glandular-strigose.....9. *stellulata.*

Racemes long, forming rather large compound terminal panicles :—

Leaves rather thick, subsessile, ovate or ovate-lanceolate, acute, the base obtuse, glabrous, up to 3 in. long, 1 in. broad, raphides minute; calyx-lobes ·1–·2 in. long, glandular hairy; corolla ventricose; capsule ·8 in. long.....10. *lineata.*

Leaves submembranous, petioled, lanceolate, acuminate at both ends, up to 4 in. long, 1–1·5 in. broad, lineolate :—

Corolla with a prominent ventricose protuberance; calyx-lobes ·15 in. long, glandular; leaves glabrous above 11. *producta.*

Corolla only slightly ventricose; calyx-lobes ·3 in. long, scaly and glandular; leaves usually strigose above 12. *explicata.*

Leaves thick, very shortly petioled, ovate or ovate-oblong, rounded at base, strigose above, without raphides, up to 2 in. long, ·5–·75 in. broad; corolla slightly ventricose; calyx-lobes ·2–·25 in. long, glandular hairy.....13. *affinis.*

Racemes short, in short terminal panicles, sometimes single; low branching undershrubs :—

Leaves ovate or lanceolate, glabrous, narrowed at both ends, submembranous, up to 2 in. long, ·75 in. broad, lineolate; panicles rarely 2 in. long; calyx-lobes ·15 in. long; corolla very little ventricose.....14. *viscosula.*

Leaves small, ovate or orbicular; racemes little branched :—

Anthers very conspicuously white-bearded; corolla pale, not ventricose; calyx-lobes ·15–·2 in., glandular; leaves ovate or orbicular, villous, soft, up to ·5 in. in diam., the margins not recurved; capsule ·6 in. long, ·1 in. broad, glandular 15. *lobelioides.*

Anthers not at all bearded; corolla dark, slightly ventricose; calyx-lobes ·2–·3 in. long, glandular; leaves ovate or elliptic, rounded or cuneate at base, villous only on the margins which are recurved, hard, up to ·6 in. long, ·3 in. broad; capsule ·6 in. long, ·1 in. broad, very glandular hirsute 16. *Lawsoni.*

Flowers in slender axillary racemes, sometimes bifid; anthers strongly bearded; retinacula spoon-shaped :—

Racemes long, up to 4 in., slender, spreading, the pedicels distant; calyx-lobes ·2 in. long; leaves ovate or orbicular, shortly petioled, villous, up to ·7 in. in diam.; capsule ·75 in. long, 8-seeded 17. *Rothii.*

Racemes short, few-flowered, the pedicels close :—

Racemes up to 1·5 in. long; calyx-lobes ·3 in. long, glandular-pubescent; leaves elliptic or obovate, subsessile, glabrous, up to 3 in. long, 1·5 in. broad; capsule ·6 in. long, 8-seeded 18. *Beddomei.*

Racemes scarcely 1 in. long; calyx-lobes ·15 in. long, glandular; leaves elliptic or ovate, subsessile, villous, up to 1 in. long, ·3 in. broad; capsule ·5 in. long, 4-seeded .....19. *glandulosa.*

Capsule elliptic :—

Capsule hairy, ·35 in. long, ·15 in. broad, 4-seeded; seeds large, dark, deeply pitted, retinacula spine-like; anthers slightly bearded; flowers erect, in slender axillary unilateral racemes, which are sometimes 2-branched and as long as or shorter than the leaves; calyx-lobes very slender, ·25–·5 in. long; leaves oblong or

elliptic, subobtuse, up to 3·5 in. long, 1 in. broad....20. *echioides.*
Capsule, acute at both ends, glabrous, ·4 in. long, ·2 in. broad, 8-seeded; seeds small, pale, deeply rugose, retinacula spoon-shaped; anthers much bearded; flowers solitary axillary or in few-flowered racemes in upper axils; calyx-lobes very slender, ·25–·4 in. long; leaves orbicular or subreniform, sessile, villous, up to 1 in. in diam.....21. *serpyllifolia.*

1. ANDROGRAPHIS PANICULATA, Nees; F. B. I. iv. 501; Wt. Ic. t. 518. *A. subspathulata*, C. B. Clarke; F. B. I. iv. 502.

   N. Circars, Deccan and Carnatic to S. Travancore in dry forest undergrowth.

   An erect herb with pink corolla, darker on the lower lip, the capsule usually 12-seeded. A bitter plant, used in medicine.

2. ANDROGRAPHIS STENOPHYLLA, C. B. Clarke; F. B. I. iv. 503.

   Deccan, about Coimbatore (Wight).

   An erect glabrous undershrub with very narrow leaves and stems from a stout rootstock, the corolla pale with dark red stripes.

3. ANDROGRAPHIS WIGHTIANA, Arn. ex Nees; F. B. I. iv. 503; Wt. Ic. t. 1558.

   W. Ghâts, Anamalais and hills of Travancore and Tinnevelly, up to 2,500 ft., in evergreen forests.

   A very slender nearly glabrous herb, the corolla pink with red-purple lower lip.

4. ANDROGRAPHIS MACROBOTRYS, Nees; F. B. I. iv. 503.

   W. Ghâts, S. Canara (Hohenacker), Anamalais, Pulneys and hills of Travancore, up to 2,500 ft., in evergreen forests.

   A stouter somewhat pubescent herb with pink corolla and dark purple-red blotches on the lower lip, as in the last.

5. ANDROGRAPHIS ELONGATA, T. And.; F. B. I. iv. 502.

   W. Ghâts, hills of Tinnevelly, in evergreen forests, at low levels.

   An erect plant with divaricate branches and inflorescence, the corolla apparently pink.

6. ANDROGRAPHIS OVATA, Benth.; F. B. I. iv. 502. *Gymnostachyum ovatum*, T. And.; Bedd. Ic. t. 250.
N. Circars, Mahendragiri Hill in Ganjam, 4,000 ft. (Gamble, Fischer and Gage), Rampa Hills of Godavari, 2,000–3,000 ft. (Gamble, V. Narayanswami); Deccan, Ananthapura in Mysore, 2,000-3,000 ft. (Meebold).
An erect rather tall herb with glandular-pubescent stem and pink corolla.

7. ANDROGRAPHIS ALATA, Nees; F. B. I. iv. 502.
W. Ghâts, E. base of slopes in Nilgiris, Coimbatore and Walayar, up to 3,000 ft. in the Gundal Valley (Fischer).
An erect herb reaching 4 ft. in height with very divaricate long branches and white corolla spotted with pink. The upper branchlets have the angles so sharp as to be slightly winged.

8. ANDROGRAPHIS NEESIANA, Wt. Ic. t. 1561; F. B. I. iv. 504.
W. Ghâts, Anamalais, Pulneys and hills of Tinnevelly, about 7,000 ft., on grass downs at the margins of sholas and on the banks of streams.
An erect handome plant about 2–3 ft. high with brownish purple flowers. The heads are usually close, but the racemes elongate later on.

9. ANDROGRAPHIS STELLULATA, C. B. Clarke; F. B. I. iv. 504.
W. Ghâts, Nilgiris about 6,000 ft. (Hohenacker, Clarke).
An erect herb with prominent calyx-lobes, the corolla pale pink with purple spots.

10. ANDROGRAPHIS LINEATA, Nees; F. B. I. iv. 504.
Deccan, hills of Cuddapah at 3,000 ft. (Gamble); Mysore and N. Coimbatore to the N. slopes of Nilgiris, 3,000–5,500 ft.; Carnatic, Sirumlai Hills of Madura.
An erect herb, the panicle branches very long and almost spicate in fruit, the corolla pale with purple blotches. Clarke's var. *Lawii*, seems quite a distinct plant but the material is very insufficient.

11. ANDROGRAPHIS PRODUCTA, Gamble n. comb. *A. Neesiana* var. *producta*, C. B Clarke; F. B. I. iv. 504.
W. Ghâts, Malabar, Travancore and Tinnevelly, up to 6,000 ft. on W. Nilgiris.
An erect herb.

12. ANDROGRAPHIS EXPLICATA, Gamble n. comb. *A. viscosula*

var. *explicata*, C. B. Clarke; F. B. I. iv. 504. *A. ceylanica*, Wt. Ic. t. 1560, *not of* Nees.

W. Ghâts, hills of Tinnevelly and Travancore, up to 5,000 ft.

An erect herb.

13. ANDROGRAPHIS AFFINIS, Nees. *A. Neesiana* var. *affinis*, T. And.; F. B. I. iv. 504.

W. Ghâts, Nilgiris and Pulneys at 5,000–7,000 ft.

A slender, many-stemmed undershrub with pale corolla streaked with purple, the inflorescence bracts prominent.

14. ANDROGRAPHIS VISCOSULA, Nees; F. B. I. iv. 504; Wt. Ic. t. 1559.

Hills of Tinnevelly, about Courtallum (Wight, etc.).

A many-branched woody undershrub reaching scarcely more than 1–1½ ft. high, the corolla apparently lilac with a few dark streaks.

15. ANDROGRAPHIS LOBELIOIDES, Wt. Spic. Nilg. t. 181, Ic. t. 1557; F. B. I. iv. 505.

W. Ghâts, Nilgiris, on the downs among grass, at 6,000–8,000 ft.

A low much-branched procumbent herb from a woody rootstock, the corolla white streaked with red

16. ANDROGRAPHIS LAWSONI, Gamble in Kew Bull. 1923, 375.

W. Ghâts, Kundahs in Nilgiris about Avalanché and Sispara, 7,000–8,000 ft., in grass.

A low undershrub with erect branches and rather long often paniculate racemes, the flowers apparently dark brownish-purple.

17. ANDROGRAPHIS ROTHII, C. B. Clarke; F. B. I iv. 506.

S. Carnatic, plains of Tinnevelly (Beddome), lower hills (Fischer).

A straggling undershrub from a woody rootstock, the flowers pale yellow with large purple blotches on the deeply cut lobes of the lower lip.

18. ANDROGRAPHIS BEDDOMEI, C. B. Clarke; F. B. I. iv. 506.

Deccan, Nallamalai Hills of Kurnool, 2,000 ft. (Beddome, *fide* F. B. I.); Larkamalai Hills of Cuddapah, up to 1,000 ft. (Fischer).

A many-branched nearly glabrous undershrub, the flowers white with purple spots on the lower lip.

19. ANDROGRAPHIS GLANDULOSA, Nees; F. B. I. iv. 505.
Deccan, in Mysore, hills of Cuddapah at 3,000 ft. (Gamble). on rocks.
A straggling small grey-pubescent undershrub, the flowers nearly white with a pale purple tinge on the lower lip.

20. ANDROGRAPHIS ECHIOIDES, Nees; F. B. I. iv. 505; Wt. Ic. t. 467.
N. Circars, Deccan and Carnatic, in all dry Districts, common.
An erect herb, villous with whitish hairs. the corolla pink or white with purple blotches on the lower lip.

21. ANDROGRAPHIS SERPYLLIFOLIA, Wt. Ic. t. 517; F. B. I. iv. 506.
Deccan and Carnatic, on dry soil, laterite and trap, up to 3,000 ft.
A trailing and rooting procumbent herb from a stout rootstock, the flowers pale with purple blotches on the lower lip.

21. Haplanthus, Nees.

Erect herbs *Leaves* entire, petioled. *Flowers* axillary, in false whorls, surrounded by numerous abortive branchlets reduced to cladodes and ending in spinous points (reduced leaves); bracts and bracteoles small. *Calyx* 5-partite, lobes linear-lanceolate. *Corolla* small, tubular, the tube slightly enlarged above, 2-lipped, the upper lip 2-fid, the lower 3-lobed. *Stamens* 2, shorter than the corolla and inserted below the throat; filaments flattened; anthers 2-celled, connivent; cells ovate, somewhat unequal, muticous, one cell with the connective bearded. *Disk* thick, prominent. *Ovary* 2-celled; ovules 3–8 in each cell; style slender; stigma linear. *Fruit* a linear-oblong capsule, compressed at right angles to the septum, 6–16-seeded. *Seeds* ellipsoid, densely hairy when wetted, retinacula obtuse.

Cladodes stout, quadrangular, ·75–1·25 in. long, ending usually in 2 spinous teeth, villous and glandular-hairy; capsule glabrous, ·4 in. long: leaves ovate, rounded at base and decurrent on the long petiole, up to 4 in. long, 2 in. broad ..... 1. *verticillaris*.
Cladodes very slender, subquadrangular, ·5 in. long, ending in 2 or more teeth, villous with long soft hairs: capsule pubescent, ·2 in. long:

leaves ovate, rounded at base and decurrent on the long petiole, up to 5 in. long, 2·5 in. broad .....2. *neilgherryensis.*

1. HAPLANTHUS VERTICILLARIS, Nees; F. B. I. iv. 506.
   Deccan, Ramandrúg Hills of Bellary (Beddome).
   A herbaceous plant, up to 3 ft. high, the corolla dark lilac with darker lines.
2. HAPLANTHUS NEILGHERRYENSIS; Wt. Ic. t. 1556. *H. tentaculatus* var. *neilgherrensis*, C. B. Clarke; F. B. I. iv. 507.
   W. Ghâts, Hills of Mysore, Coorg, S. Canara and Malabar, up to 3,000 ft.
   An erect herbaceous plant, with the flowers and cladodes collected in conspicuous soft terminal spikes, the corolla bright blue (Hb. Madr.).

22. Gymnostachyum, Nees.

Herbs or undershrubs. *Leaves* cauline or subradical, entire or toothed. *Flowers* subsessile or shortly pedicellate, in axillary cymes or in a terminal spicate or racemose panicle; bracts and bracteoles very small. *Calyx* 5-partite, the lobes linear-lanceolate. *Corolla*-tube slender; limb short, 2-lipped, the lobes subequal, imbricate. *Stamens* 2, included or slightly exerted, filaments slender, usually villous near the base; anthers 2-celled, the cells subequal, oblong or ovate, glabrous or hairy. *Ovary* 2-celled; ovules, numerous in each cell; style slender; stigma subentire. *Fruit* a linear capsule, 16–24-seeded. *Seeds* ovoid, compressed, with soft hairs when wetted.

Inflorescence terminal; leaves chiefly at the base of the stem :—
  Corolla large, 1–1·5 in. long, glabrous; leaf-blade ovate, rounded at base and then long-decurrent on the petiole, about 6 in. long; anthers bearded .....1. *febrifugum.*
  Corolla moderate-sized, ·7 in. long, puberulous; leaf-blade ovate, rounded or cordate at base, not decurrent, up to 3 in. long; anthers glabrous .....2. *polyanthum.*
Inflorescence axillary, sometimes also terminal :—
  Corolla small, up to ·7 in. long, pubescent; leaves ovate, acute and slightly decurrent at base, serrulate, 8 in. long or longer; anthers puberulous .....3. *canescens.*
  Corolla large, 1 in. long, nearly glabrous; leaves broadly ovate,

rounded or truncate at base, not usually decurrent, entire, up to 9 in. long; anthers glabrous but the connective rough . . 4. *latifolium*.

1. GYMNOSTACHYUM FEBRIFUGUM, Benth.; F. B. I. iv. 508. *G. alatum*, Wt. Ic. t. 1525.

   W. Coast and W. Ghâts, S. Canara, Malabar and Travancore.

   A small nearly stemless and scapigerous herb with apparently blue flowers, the large usually long-petioled leaves lineolate and undulate crenulate.

2. GYMNOSTACHYUM POLYANTHUM, Wt. Ic. t. 1494; F. B. I. iv. 508.

   W. Ghâts, in Coorg (Jerdon).

   A scapigerous herb with a long inflorescence of small opposite cymes in a raceme, the leaves not lineolate though minutely punctate.

3. GYMNOSTACHYUM CANESCENS, T. And.; F. B. I. iv. 509. *G. serrulatum*, T. And.; Bedd. Ic. t. 254. *Cryptophragmium canescens*, Nees; Wt. Ic. t. 1495.

   W. Ghâts, in Malabar, Nilgiris, Anamalais, Travancore and Tinnevelly, up to 4,000 ft., in evergreen forests.

   A shrubby glandular-hairy plant with small flowers green and yellow (Meebold), the leaves large, lineolate and parallel-nerved, white-pubescent beneath when young.

4. GYMNOSTACHYUM LATIFOLIUM, T. And.; F. B. I. iv. 509. Bedd. Ic. t. 253. *Phlogacanthus latifolius*, Wt. Ic. t. 1537.

   W. Ghâts, in S. Canara, Coorg and Malabar; Bababudan Hills of Mysore, up to 4,000 ft.

   A glabrous undershrub up to 3 ft. high with greenish yellow flowers, the very long-petioled leaves not lineolate, parallel-nerved, the lower nerves close together.

Var. *decurrens*, Gamble. Leaves acuminate at base and decurrent on the long petiole, the nerves equally spaced, the calyx-lobes rather shorter.

W. Ghâts at Manantoddy, Wynaad (Lawson).

23. Diotacanthus, Benth.

Shrubs. *Leaves* large, membranous, entire or obscurely crenate, not or obscurely lineolate. *Flowers* in lax cymes.

axillary or in terminal trichotomous panicles; bracts small, narrow; bracteoles minute. *Calyx* 5-partite, the lobes linear-subulate, subequal. *Corolla*-tube short; limb deeply 2-lipped, ventricose, the upper lip erect, emarginate or shortly 2-lobed, the lower spreading, 3-lobed, the bases shortly auricled. *Stamens* 2, about as long as the corolla; filaments thickened; anthers oblong, 2-celled, dorsifixed. *Disk* cupular, thick. *Ovary* 2-celled; ovules many in each cell; style filiform; stigma small, capitate. *Fruit* a linear terete capsule, 2-cleft from the base. *Seeds* many, about 24, compressed, hairy, especially when wet.

Flowers in terminal panicles axillary to upper leaves often 18 in. long; corolla crimson; leaves lanceolate or oblanceolate, acuminate, glabrous, up to 12 in. long, 3·5 in. broad, main nerves about 18 pairs; capsule 1·25 in. long ..... 1. *grandis.*
Flowers in axillary cymes about 3 in. long; corolla white; leaves lanceolate, acute or acuminate, nearly glabrous, up to 5 in. long, 2 in. broad, main nerves 7–8 pairs; capsule 1·5 in. long..... 2. *albiflorus.*

1. DIOTACANTHUS GRANDIS, Benth.; F. B. I. iv. 515. *Phlogacanthus grandis*, Bedd. Ic. t. 179.
   W. Ghâts, hills of Tinnevelly and Travancore, up to 4,000 ft., in dense moist forests.
   A large shrub, reaching 12 ft. in height.
2. DIOTACANTHUS ALBIFLORUS, Benth.; F. B. I. iv. 515. *Phlogacanthus albiflorus*, Bedd. Ic. t. 180.
   W. Ghâts, hills of Tinnevelly and Travancore, up to 5,000 ft., in evergreen forest.
   A shrub reaching 7–10 ft. in height.

24. Crossandra, Salisb.

Undershrubs. *Leaves* opposite or whorled, entire or undulate, sometimes slightly toothed. *Flowers* sessile, yellow, in linear-oblong spikes; bracts rather large, imbricate; bracteoles linear or lanceolate. *Calyx* 5-partite to the base, upper 2-lobed, 2-nerved, 2 lower oblong, sometimes connate, 2 inner small, lanceolate. *Corolla*-tube long, linear, incurved; limb unilateral, forming a lip of 5 subequal lobes. *Stamens* 4, didynamous, included in the tube, anthers 1-celled. *Ovary* 2-celled, ovules 2 in each cell; style linear; stigma 2-lobed. *Fruit* an oblong

acute capsule. *Seeds* 4, compressed, clothed with appressed fringed scales formed of many connate hairs.

CROSSANDRA UNDULAEFOLIA, Salisb.; F. B. I. iv. 492. *C. axillaris*, Nees; Wt. Ic. t. 460.

Deccan, from the Godavari southwards, west to the Ghâts, in open forest land, commonly planted in gardens and about temples.

A pretty undershrub up to 3 ft. high with orange-yellow flowers and whorled leaves, lanceolate, acute, decurrent at base, up to 6 in. long, 2 in. broad.

25. Barleria, Linn.

Small shrubs or undershrubs, spinous or unarmed. *Leaves* opposite, entire, usually lineolate with cystoliths. *Flowers* showy, solitary or in lax or dense spikes or racemes or helicoid cymes often crowded towards the ends of the branches; bracts 1 fertile, 1 sterile, sometimes reduced to spines; bracteoles 0. *Calyx* deeply 4-partite, the lobes in opposite pairs, the outer pair the larger with the anterior lobe more or less bifid and apparently of 3 connate lobes. *Corolla* large, the tube more or less cylindric at base, funnel-shaped above; lobes 5, subequal, imbricate in bud. *Stamens* 2 long and fertile with oblong 2-celled anthers, 2 small and rudimentary with anthers having sometimes a little pollen, often a fifth quite rudimentary. *Disk* large, cupular, half embracing the ovary. *Ovary* 2-celled; ovules 2 in each cell; style long; stigma bifid or subentire. *Fruit* an ovoid or oblong capsule 2- or 4-seeded below the middle. *Seeds* compressed, equally clothed with wavy silky appressed hairs, rarely glabrous.

Shrubs or undershrubs with sharp intrapetiolar spines, usually white; Capsule ovoid, with a solid beak, 2-seeded close to the base :—

Flowers sessile, solitary in lower axils, spicate above; inflorescence bracts foliaceous, oblong, sharply mucronate, floral bracts linear-subulate; leaves elliptic, acuminate, bristly mucronate, glabrous above, often pubescent beneath, up to 7 in. long, 2·5 in. broad, petioled ..... 1. *Prionitis.*

Flowers subsessile, mostly solitary axillary; inflorescence bracts lanceolate, mucronate, floral bracts 0 or mere bristles; leaves oblong-lanceolate, acute, bristly mucronate, glabrous, pale beneath, up to 2·5 in. long, ·5 in. broad, subsessile .. 2. *cuspidata.*

Capsule oblong or ellipsoid, the beak not solid, 4-seeded; flowers solitary, no bracts except the spines :—

Outer calyx-lobes oblong or obovate at first, about ·3–·6 in. long, longer and reticulate in fruit, sometimes emarginate, sometimes with 1–2 spinous teeth, inner small; corolla-tube up to 1 in. long; leaves orbicular or ovate, spinous-mucronate, ·5–·75 in. in diam. 3. *buxifolia.*

Outer calyx-lobes broadly ovate, spinous-toothed, about ·75 in. long, softly hairy, scarious, nerved and reticulate in fruit, inner very small; corolla-tube up to 1·5 in. long; leaves elliptic or obovate, obtuse, mucronate, tomentose, ·5–1 in. in diam. 4. *mysorensis.*

Outer calyx-lobes ovate, spinous-toothed, about ·75 in. long, prominently white-scarious, nerved and reticulate in fruit, inner lanceolate, ·4 in. long; leaves oblong or obovate, obtuse or acute, mucronate, ·75–1 in. long.....5. *noctiflora.*

Shrubs or undershrubs without spines :—

Flowers in loose many-branched leafy panicles of solitary flowers or somewhat scorpioid cymes; bracts linear; leaves rather small, hairy; capsule 4-seeded, the seeds with appressed hairs :—

Outer calyx-lobes entire, not spinescent-toothed :—

Outer calyx-lobes ovate, obtuse at base, pale and scarious in fruit and prominently reticulate with spreading nerves, ·75–1 in. long; corolla-tube very slender, cylindric to near the top, up to 6 in. long, lobes ovate, ·5 in. long; leaves ovate-deltoid, acute, closely softly grey-tomentose, up to 1·75 in. long, 1 in. broad.....6. *longiflora.*

Outer calyx-lobes oblong or spathulate, acute, sometimes bifid, pale and scarious in fruit, ·5–·75 in. long :—

Corolla cylindric below, then funnel-shaped, the tube 2 in. long, lobes elliptic-ovate, ·75 in. long; leaves elliptic or ovate, acuminate at both ends, yellowish-hirsute with spreading hairs, up to 3 in. long, 1·5 in. broad .....7. *tomentosa.*

Corolla-tube cylindric, scarcely enlarged above, ·75–1·5 in. long, lobes orbicular, ·3 in. in diam.; leaves ovate, acute, obtuse at base, softly and shortly appressed-tomentose, pale beneath, up to 2 in. long, 1·5 in. broad .....8. *acuminata.*

Outer calyx-lobes ovate-orbicular, reticulate and about 5–7-nerved, with spinescent teeth, ·5 in. in diam.; corolla-tube slender, gradually enlarging upwards, about 1 in. long, lobes obovate, about ·6 in. long; leaves thin, ovate-acuminate, softly villous, up to 4 in. long, ·2 in. broad, long-petioled ....9. *pilosa.*

Flowers large, in a panicle of terminal and axillary helicoid racemes at the ends of the branches; bracts linear; leaves large and glabrescent; capsule 4-seeded, the large seeds appressed-hairy:—

Corolla-tube at first cylindric, soon widening and funnel-shaped, expanding in obovate lobes 3–3·5 in. long in all; outer calyx-lobes oblong, 1 in. long, tawny-pubescent, inner ·5 in. long; leaves elliptic, acuminate at both ends, sparsely pubescent, up to 12 in. long, 3 in. broad .....10. *involucrata* var. *elata*.

Corolla-tube cylindric, funnel-shaped at top, the lobes suborbicular, emarginate, 2·5–3 in. long in all; outer calyx-lobes lanceolate, one deeply bifid, ·5–·7 in. long, inner ovate, long-apiculate, ·4 in. long; leaves membranous, elliptic, long-acuminate at both ends, pilose, up to 6 in. long, 2 in. broad .....11. *paniculata*.

Flowers medium-sized or large, in axillary and terminal spikes or racemes or sometimes solitary, closer and less leafy upwards:—

Outer calyx-lobes not spinous-ciliate:—

Flowers in tawny-pubescent racemes with very short pedicels; bracts linear-oblong, ·4–·7 in. long, glandular; outer calyx-lobes elliptic-ovate, nervose, one acuminate, the other shortly bilobed, 1 in. long, inner lanceolate, ·3 in. long; corolla long- and narrowly-funnel-shaped, pubescent, veined, 3–3·5 in. long; leaves lanceolate, acuminate at both ends, up to 4 in. long, 2 in. broad .....12. *Lawii*.

Flowers in glandular-hairy tawny spikes; bracts linear, ·3 in. long; outer calyx-lobes ovate or ovate-lanceolate, nervose, one slightly bifid at apex, ·75–1 in. long; corolla with short cylindric tube, then funnel-shaped, glabrous, lobes obovate, 1·5–2·5 in. long in all; leaves lanceolate or elliptic, acuminate at both ends, glabrous, up to 6 in. long, 3 in. broad
13. *courtallica*.

Outer calyx-lobes spinous-ciliate, ovate-lanceolate, hairy, mucronate or one sometimes bimucronate, prominently nerved and reticulate, at length white, about ·75 in. long, inner smaller; flowers in dense strigosely hairy spikes; bracts linear, usually reflexed, spinous-ciliate, ·5 in. long; corolla-tube cylindric then funnel-shaped, lobes ovate, 1–2 in. long in all; leaves variable, ovate or lanceolate or linear-oblong, up to 4 in. long, 1·5 in. broad
14. *cristata*.

Flowers large, solitary in upper leaf-axils and gradually passing into terminal spikes:—

Seeds densely silky:—

Outer calyx-lobes 1 in. long, prominently ciliate with long

hairs, one lanceolate 3-nerved, the other bifid to the middle each side 2-nerved, inner pair linear, ·75 in. long; bracts oblong, longer than the calyx; corolla-tube cylindric below funnel-shaped above, lobes obovate emarginate, in all 2 in. long; leaves ovate, sessile, nearly glabrous, up to 2 in. long, 1 in. broad.....15. *Stocksii.*

Outer calyx-lobes 1·5 in. long, nearly glabrous, ovate, ·75 in. broad, one sometimes slightly bifid, inner pair linear, ·75 in. long; bracts linear-spathulate, shorter than the calyx; corolla tube funnel-shaped, lobes obovate, 2–2·5 in. in all; leaves ovate-lanceolate, acuminate at both ends, glabrous, petioled, up to 5 in. long, 2 in. broad.....16. *montana.*

Seeds glabrous, black; outer calyx-lobes elliptic, acute, 1·25 in. long, ·5–·75 in. broad, glabrous; bracts subulate, ·5 in. long; corolla-tube broadly funnel-shaped, lobes obovate, up to 2·5 in. long in all; leaves ovate or lanceolate, glaucous beneath, up to 7 in. long, 3 in. broad.....17. *Gibsoni.*

Flowers in dense unilateral spikes at the ends of the branchlets; outer calyx-lobes with 9–11 nerves radiating from the base, scarious in fruit; corolla cylindric below, funnel-shaped above, 1·5–2 in. long; capsule 4-seeded :—

Leaves large, ovate, acuminate, long-decurrent on the petiole, glabrate, up to 9 in. long, 4·5 in. broad, main nerves 6–8 pairs; bracts ovate or lanceolate, shorter than the calyx; outer calyx-lobes subequal but one sometimes shortly bifid, ovate, ciliate-denticulate, minutely strigose, 1 in. long, ·75 in. broad, inner linear-lanceolate, white-hirsute, ·5 in. long.....18. *strigosa.*

Leaves small, ovate, acute, shortly decurrent, strigose beneath, up to 2 in. long, 1 in. broad, main nerves 5 pairs; bracts ovate, 5-ribbed, short; outer calyx-lobes unequal, subspinosely denticulate on the margins, outside with long stiff hairs, up to 1·25 in. long, ·75 in. broad, inner linear, strigose, ·4 in. long

19. *nitida.*

1. BARLERIA PRIONITIS, Linn.; F. B. I. iv. 482; Wt. Ic. t. 452.

All plains Districts, especially the Deccan and Carnatic, chiefly on waste lands and roadsides, sometimes planted in hedges.

A prickly very variable shrub with yellow, or sometimes whitish, flowers. Vern. *Hind.* Katsareya; *Tel.* Mulu govinda.

2. BARLERIA CUSPIDATA, Heyne; F. B. I. iv. 483; Wt. Ic. t. 451.

   Dry Districts of the Circars, Deccan and Carnatic.

   A very prickly small shrub with white yellow or fawn-coloured flowers and very long straight thorns.

3. BARLERIA BUXIFOLIA, Linn.; F. B. I. iv. 483; Wt. Ic. t. 870.

   Dry Districts of the Deccan and Carnatic, up to 4,000 ft., chiefly on roadsides and waste lands.

   A small very prickly hairy shrub with pink or white flowers, sometimes with long pedicels, but more often nearly sessile. The calyx-lobes enlarge and become scarious in fruit.

4. BARLERIA MYSORENSIS, Roth; F. B. I. iv. 484.

   W. Deccan, in Coimbatore, dry places in Malabar and Travancore.

   A small prickly shrub with blue or purple flowers, the spines usually long.

5. BARLERIA NOCTIFLORA, Linn. f.; F. B. I. iv. 484.

   Deccan and Carnatic, chiefly in somewhat hilly country, on dry waste lands.

   A small very prickly shrub, colour of flowers not recorded. The spines are sometimes leafy-margined, showing their bracteate character.

6. BARLERIA LONGIFLORA, Linn. f.; F. B. I. iv. 485.

   N. Circars, Deccan and Carnatic, especially on dry rocky hills.

   A shrub with very white appearance and very long white flowers, sometimes reaching even 6 inches, usually solitary with a small branchlet opposite.

7. BARLERIA TOMENTOSA, Roth; F. B. I. iv. 485.

   Deccan and Carnatic, from the Kistna river southwards, westwards to the drier E. slopes of the W. Ghâts up to 4,000 ft.

   A low shrub with rose-coloured (?) flowers and obovoid capsules.

8. BARLERIA ACUMINATA, Wt. Ic. t. 450. *B. tomentosa*, Roth var. acuminata, C. B. Clarke; F. B. I. iv. 485.

   Deccan, Carnatic and E. side of W. Ghâts, up to 5,000 ft.

   A low shrub with apparently blue flowers. It is near to

the last but is quite distinct in its flowers and indumentum and in the shape of the leaves. The capsules are narrower.

9. BARLERIA PILOSA, Wall.; F. B. I. iv. 486; Bedd. Ic. t. 256.
W. Ghâts, hills of Tinnevelly up to 1,500 ft.
A small softly pilose undershrub with sky-blue flowers, solitary in the leaf-axils.

10. BARLERIA INVOLUCRATA, Nees; F. B. I. iv. 486; Wt. Ill. t. 164.
Var. *elata*, C. B. Clarke.
W. Ghâts, in all Districts, in Shola forests at 3,000–6,000 ft.
A handsome shrub reaching 6 ft. in height, the large flowers blue.

11. BARLERIA PANICULATA, Wall.
Foot of the W. Ghâts, in Malabar, Cochin and Travancore, often on rocky river banks (Bourne).
A pretty shrub with rose pink flowers.

12. BARLERIA LAWII, T. And.; F. B. I. iv. 486. *B. Beddomei*, T. And. ex Bedd. Ic. t. 258.
Bababudan Hills of Mysore (Law *fide* T. And.).
A shrub with long white flowers, prominently veined when dry.

13. BARLERIA COURTALLICA, Nees; F. B. I. iv. 489; Wt. Ic. t. 1529.
N. Circars, Rampa Hills of Godavari, at 2,000 ft. (Gamble); W. Ghâts, in all Districts, in open places in evergreen forests at low elevations.
A shrub reaching 3–4 ft. high with large blue flowers, yellow in the tube.

14. BARLERIA CRISTATA, Linn.; F. B. I. iv. 488; Wt. Ic. t. 453.
All dry plains Districts, in deciduous forest or bushy places, up to about 3,000 ft., sometimes cultivated in gardens.
A nearly herbaceous hairy undershrub with usually blue but sometimes pink or even white flowers, very variable in the leaves and calyx-lobes. The Circar specimens show usually narrow leaves, the W. Coast ones rounded leaves.

15. BARLERIA STOCKSII, T. And.; F. B. I. iv. 489.
Bababudan Hills of Mysore (Stocks), Kottakota and Gootoor Hills of Anantapur at 2,000 ft. (Gamble).

A small undershrub with pink (?) flowers and a beaked capsule with floccosely woolly seeds.

16. BARLERIA MONTANA, Nees; F. B. I. iv. 487.
N. Circars, Godavari valley (Gamble); Kambakam Hill in Chingleput (Cleghorn); hills of Coimbatore and Madura (Fischer); Cochin, at Trichoor (Wight).
A subherbaceous undershrub with blue flowers and an acuminate capsule with wavily silky seeds.

17. BARLERIA GIBSONI, Dalz.; F. B. I. iv. 487. *B. montana*, Bedd. Ic. t. 257.
Deccan, Nallamalai Hills of Kurnool, Ramandrúg in Bellary; W. Ghâts, Coorg, Malabar, Anamalais (Beddome, etc.).
A glabrous undershrub with pink flowers and black flat glabrous seeds.

18. BARLERIA STRIGOSA, Willd.; F. B. I. iv. 489.
N. Circars, in all Forest undergrowth, up to 4,000 ft., common; Deccan, in the forests of the Kurnool Nallamalais and Ramandrúg in Bellary, scarce.
A shrub reaching 4 ft. high with large blue flowers, the seeds very shaggy with long white hairs when wet.

19. BARLERIA NITIDA, Nees; F. B. I. iv. 490; Wt Ic. t. 454.
W. Ghâts, hills of Tinnevelly.
A small shrub with blue flowers, the seeds with appressed brown hairs.

26. Neuracanthus, Nees.

Herbs or undershrubs. *Leaves* opposite, entire. *Flowers* small, spicate, the spikes axillary or terminal, elongate, strobilate or capitate; bracts ovate, imbricate, strongly nerved; bracteoles 0 or minute. *Calyx* 2-partite, the posterior lip 3-, the anterior 2-lobed. *Corolla* tubular below, funnel-shaped above; limb plicate, entire or subbilabiate. *Stamens* 4, didynamous, included, inserted on the middle of the tube; anterior anthers perfectly 2-celled, posterior with 1 perfect, 1 imperfect cell. *Disk* inconspicuous. *Ovary* 2-celled; ovules usually 2 in each cell; style short; stigma of one oblong lobe. *Fruit* an oblong glabrous capsule, 4-seeded. *Seeds* much compressed, ovoid or suborbicular, silky.

NEURACANTHUS NEESIANUS, C. B. Clarke; F. B. I. iv. 491.
Carnatic. Polur in N. Arcot, on black cotton soil (Wight).
A procumbent hoary-tomentose undershrub with thick leaves about 2 in. long, 1 in. broad, the flowers very small in dense terminal bracteate spikes.

27. Asystasia, Blume.

Herbs or undershrubs. *Leaves* opposite, entire or rarely wide-toothed; usually lineolate. *Flowers* in lax or dense, usually 1-sided, simple or compound, spikes or racemes; bracts opposite, usually very small, bracteoles usually minute. *Calyx* deeply 5-partite, the lobes equal, linear or lanceolate. *Corolla*-tube cylindric below, inflated above, ventricose or funnel-shaped; lobes 5 subequal, imbricate in bud. *Stamens* 4, didynamous, perfect; filaments connate at the base in pairs; anthers oblong, the cells parallel, approximate, minutely spurred at the base or muticous. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma 2-fid or subcapitate. *Fruit* an elliptic capsule with a contracted solid base, opening widely in a reflexed curve. *Seeds* 4, compressed, orbicular or angular, glabrous, rugose or tuberculate.

Bracts very small; inflorescence secund, of lax racemes of rather distant flowers :—

Branches and leaves grey-puberulous; leaves ovate, acute, usually rounded or subcordate or suddenly narrowed at base, 1–2·5 in. long, 1–1·5 in. broad; calyx-lobes linear, ·3 in. long, hirsute; corolla with short cylindric base, the upper part ventricose, much longer, in all 1–1·25 in. long ..... 1. *gangetica.*

Branches and leaves green, glabrous or slightly pubescent :—

Leaves entire on the margins :—

Leaves elliptic, ovate or narrowly lanceolate, glabrous, the base always narrowed; inflorescence paniculate; corolla white or pale purple, about ·75 in. long or less
2. *chelonoides* var. *quadrangularis.*

Leaves ovate, more or less pubescent, the base in upper branches usually rounded and then decurrent on the petiole, in the lower ones narrowed, the petioles long; inflorescence of solitary or twin terminal racemes; corolla blue, 1–1·5 in. long ..... 3. *violacea.*

Leaves linear-lanceolate, elongate, often pubescent, the base cuneate; inflorescence of few subpanicled racemes; corolla violet, 1·25–1·5 in. long ..... 4. *travancorica.*

Leaves crenulate or crispate on the margins, elliptic or ovate often obtuse at base; inflorescence of usually solitary or twin terminal racemes; corolla white with rose or purple spots
5. crispata

Bracts and bracteoles large, membranous, oblong-lanceolate; inflorescence erect, of close spikes; corolla small, ·5–·75 in. long, white leaves elliptic, acute at both ends, sparsely hairy.....*6. Lawiana*

1. ASYSTASIA GANGETICA, T. And. *A. coromandeliana*, Nees F. B. I. iv. 493.

   N. Circars, Deccan and Carnatic, especially near the sea westwards to the E. slopes of the Ghâts; often cultivated in gardens.

   A straggling, often somewhat climbing, perennial herb with smallish leaves and variable flowers, white blue purple or yellow.

2. ASYSTASIA CHELONOIDES, Nees: F. B. I. iv. 493.

Var. *quadrangularis*, C. B. Clarke.

   W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Tinnevelly and Travancore, 2,000–5,000 ft.

   A straggling herb with membranous leaves, sparingly strigosely hairy, up to 9 in. long, 3 in. broad.

3. ASYSTASIA VIOLACEA, Dalz.; F. B. I. iv. 494.

   W. Ghâts, from S. Canara southwards, at low levels.

   An erect herb with membranous nearly glabrous leaves.

4. ASYSTASIA TRAVANCORICA, Bedd. Ic. t. 178; F. B. I. iv. 494.

   W. Ghâts, Anamalai Hills (Barber) at 3,000 ft.; hills of Tinnevelly and Travancore, especially in the south.

   A large shrub with narrow leaves reaching 5 in. in length and at most, though rarely, 1 in. in diam. It grows to 8 ft. in height and is the handsomest species of the genus (Beddome).

5. ASYSTASIA CRISPATA, Benth.; F. B. I. iv. 494. *A. coromandeliana*, Wt. Ic. t. 1506, *not of* Nees.

   W. Ghâts, Nilgiri and Pulney Hills, at 4,000–8,000 ft., in Shola forests.

   A branching herbaceous undershrub with crispate or sometimes entire leaves variable in size but often up to 5 in. long, 2 in. broad.

6. ASYSTASIA LAWIANA, Dalz.; F. B. I. iv. 496.

W. Deccan, in Mysore and Coorg.

An erect herbaceous plant reaching 3 ft. in height, the leaves up to 3 in. long, 1·5 in. broad, the flowers white.

28. Pseuderanthemum, Radlkf.

Glabrous shrubs or undershrubs. *Leaves* opposite, usually lineolate. *Flowers* subsessile, solitary or 1–3 together in the axils of opposite bracts arranged in terminal dense or interrupted simple or branched spikes; bracteoles small, narrow. *Calyx* 5-fid or 5-partite, the lobes narrow subequal. *Corolla*-tube elongate, cylindric, narrow, rarely widened at the throat; limb 5-partite, the lobes elliptic, spreading, flat, unequal. *Stamens* 2 fertile with usually 2 upper small clavate staminodes; anthers 2-celled, the cells oblong, equal, parallel, the connective widened. *Disk* annular or cupular. *Ovary* 2-celled, usually glabrous; ovules 2 in each cell; style filiform; stigma entire or shortly 2-lobed. *Fruit* an oblong capsule with contracted solid stalk, 4-seeded. *Seeds* compressed, orbicular, smooth or rugose, on acute retinacula.

PSEUDERANTHEMUM MALABARICUM, Gamble n. comb. *Eranthemum malabaricum*, C. B. Clarke; F. B. I. iv. 497.

N. Circars, Palkonda Hills of Vizagapatam (Gamble); Deccan, in Mysore and N. Arcot; W. Ghâts from S. Canara to Travancore, in evergreen forest.

An undershrub with white flowers, the leaves ovate or elliptic, acuminate, up to about 5 in. long, 2 in. broad, the capsule valves springing back, the seeds wavy-rugose.

29. Lepidagathis, Willd.

Herbs or undershrubs. *Leaves* entire or crenate-serrate, usually lineolate. *Flowers* sessile, usually capitate, sometimes opposite and solitary, the heads terminal or axillary, sometimes densely crowded at the base of the plant; bracts usually conspicuous, bracteoles smaller. *Calyx* deeply 5-lobed, the upper lobe large, the 2 lower opposite it and usually more or less joined, the 2 inner smaller and narrower. *Corolla*-tube cylindric below, above suddenly expanded and 2-lipped, the upper lip erect 2-fid, the lower 3-lobed, usually spotted. *Stamens* 4, didynamous;

anthers 2-celled, the cells oblong, opposite or one above the other. *Disk* annular. *Ovary* 2-celled; ovules 2, rarely 1, in each cell; style slender; stigma capitellate, shortly 2-lobed or entire. *Fruit* a compressed conoid or oblong capsule. *Seeds* 2 or 4, flattened, hairy.

Capsule 2-seeded, 2-valved from the subsolid tip :—

Spikes aggregated at the base of the stem in globose cushions :—

Bracts and calyx-lobes with dense soft silky hairs, no stiff ones :—

Bracts and calyx-lobes long spinous-mucronate, the bracts broadly ovate ; lower calyx-lobes joined to about half-way up ; leaves linear-oblong, lineolate, nearly glabrous, up to 1·25 in. long, ·25 in. broad.....1. *cristata.*

Bracts and calyx-lobes shortly spinous-mucronate, the bracts broad, obtuse ; lower calyx-lobes joined to near the top ; leaves oblong or obovate, scabrous on the 5–6 pairs of nerves beneath, ciliate, up to 1·5 in. long, ·4 in. broad.....2. *mitis.*

Bracts and calyx-lobes glabrescent but ciliate with long stiff white hairs, all long-spinous mucronate :—

Bracts ovate, suddenly long spinous-acuminate ; lower calyx-lobes joined to about ⅔rds the way up ; leaves ovate or obovate-oblong, obtuse, up to 1·5 in. long, ·6 in. broad, prominently 5–6-nerved, scabrous on the nerves beneath....3. *subarmata.*

Bracts lanceolate, long spinous-acuminate ; lower calyx-lobes joined to half-way up ; leaves linear or narrowly oblong, scabrous on the nerves beneath, ciliate on the margins, up to 4 in. long, ·4 in. broad, nerves 5–7 pairs, distant
4. *Hamiltoniana.*

Spikes ovoid, not aggregated at the base of the stem but axillary on the branches :—

Leaves spinous-mucronate, coriaceous :—

One spine usually only at the tip of the small obovate obtuse leaf scarcely ·5 in. long ; lower calyx-lobes not joined ; heads ovoid, ·5–·75 in. long, the bracts and calyx-lobes all long, spreading or recurved spinous-acuminate .....5. *spinosa.*

Margins of the leaves spinous-serrate as well as the tip :—

Leaves ovate with about 3–4 sharp spinous-mucronate teeth on either side, up to ·75 in. long, ·5 in. broad ; lower calyx-lobes joined to about one-third of the way up ; heads broadly ovoid, about ·5 in. long, the spreading bracts and the calyx-lobes long spinous-mucronate, very woolly with soft silky hairs inside .....6. *pungens.*

Leaves ovate-oblong with about 3 short spinous teeth on

either side, up to ·75 in. long, ·25 in. broad; lower calyx-lobes joined to about one-half of the way up; heads ovoid, about ·5 in. long, the closely adpressed bracts and calyx-lobes shortly spinous-mucronate and with soft hairs....7. *Barberi*

Leaves not spinous-mucronate or coriaceous, linear or elliptic, nearly glabrous, up to 1·25 in. long, ·1–·3 in. broad; lower calyx-lobes joined to about one-fourth the way up; heads ovoid, ·5–·75 in. long, usually axillary but sometimes also aggregated at the base of the stem, the bracts and calyx-lobes long-acuminate, mucronate, softly and long hairy.....8. *diffusa.*

Capsule 4-seeded, 2-valved, the tip not subsolid :—

Leaves entire or undulate :—

Flowers in elongate villous spikes, the bracts coriaceous, 3-ribbed, sharply mucronate; lower calyx-lobes joined about ¼ way up, 3-ribbed as is the larger upper lobe; corolla-tube short, slightly villous within; anther-cells at rather different levels; leaves of the main stem lanceolate, acuminate, long-decurrent at base, up to 6 in. long, 2 in. broad, upper leaves smaller, sometimes almost linear .....9. *cuspidata.*

Flowers in congested heads, the bracts scarious, mucronate :—

Heads terminal ovoid, the bracts obovate, many-ribbed, lower calyx-lobes joined about ⅓ way up, 3-ribbed, upper larger, 7-ribbed; corolla-tube short, villous at the middle within; anther-cells equal and opposite, filaments long and slender; leaves ovate, tawny-pubescent beneath, long-petioled, up to 1·5 in. long, 1 in. broad.....10. *scariosa.*

Heads axillary and terminal, often clustered, small or large, the bracts hyaline, 1-nerved, ciliate; lower calyx-lobes very narrow, 1-nerved, joined to half way up, upper slightly larger; corolla-tube long, glabrous; anther-cells small, one a little above the other; filaments short; leaves variable, lanceolate, acuminate, decurrent at base, up to 6 in. long, 2·5 in. broad 11. *hyalina.*

Leaves crenate-serrate, ovate or lanceolate, acuminate, obtuse and then acuminately decurrent at base, up to 4·5 in. long, 2 in. broad; flowers in small soft heads in axillary or terminal leafy cymes, the bracts 3-ribbed, ovate; lower calyx-lobes narrow, only joined at base, 1-nerved; corolla-tube rather long; anther-cells separated; capsule very thin, pubescent .....12. *fasciculata.*

1. LEPIDAGATHIS CRISTATA, Willd.; F.-B. I. iv. 516; Wt. Ic. t. 455.

N. Circars and Carnatic, in dry places and on rocks.

A stiff undershrub, the branches procumbent from a hard central rootstock, sometimes with occasional globose small heads of flowers in the axils; corolla white, spotted with brown and purple.

2. LEPIDAGATHIS MITIS, Dalz.; F. B. I. iv. 516.
   Deccan and Carnatic, in dry sandy places, especially in Nellore, Cuddapah and N. Arcot; plains of S. Canara.
   A stiff undershrub, similar to the last but the globose flower heads denser and hardly spinous and more woolly; corolla white or pale pink, spotted with brown and purple.
3. LEPIDAGATHIS SUBARMATA, Gamble n. comb. *L. mitis* var. *subarmata*, C. B. Clarke; F. B. I. iv. 516. *L. rupestris*, Bedd. Ic. t. 229.
   Deccan, Cuddapah and Kurnool to Coimbatore, chiefly on black cotton soil.
   A stiff undershrub, the globose flower heads smaller.
4. LEPIDAGATHIS HAMILTONIANA, Wall.; F. B. I. iv. 516.
   N. Circars, open places in the Ganjam Sál forests (Gamble).
   A stiff undershrub, the branches sometimes bearing heads smaller than those at the base of the stem.
5. LEPIDAGATHIS SPINOSA, Wt. *ex* Nees; F. B. I. iv. 517.
   S. Carnatic, plains of Tinnevelly.
   A stiff prostrate much-branched spinous shrub.
6. LEPIDAGATHIS PUNGENS, Nees; F. B. I. iv. 517.
   S. Carnatic, near Palamcottah in Tinnevelly.
   A stiff much-branched small spinous shrub.
7. LEPIDAGATHIS BARBERI, Gamble n. comb. *L. pungens*, Wt. Ic. t. 456, *not of* Nees.
   W. and S. Carnatic, plains of Coimbatore, Madura and Tinnevelly (Barber, Beddome, Fischer).
   A much-branched small shrub with white stems, usually erect.
8. LEPIDAGATHIS DIFFUSA, C. B. Clarke; F. B I. iv. 518.
   Deccan and W. Carnatic, Mysore, Bellary and Coimbatore.
   A low straggling shrublet from a woody rootstock.
9. LEPIDAGATHIS CUSPIDATA, Nees; F. B. I. iv. 519; Bedd. Ic. t. 227.
   N. Circars and Deccan, up to about 6,000 ft. in the hills, Coorg.

An erect undershrub. up to about 3 ft. high, the corolla white with purplish spots.

10. LEPIDAGATHIS SCARIOSA, Nees; F. B. I. iv. 520; Wt. Ic. t. 457.

Carnatic and E. slopes of the W. Ghâts, from Coimbatore southwards.

A small undershrub, the corolla apparently white or pale yellow.

11. LEPIDAGATHIS HYALINA, Nees; F. B. I. iv. 521.

All Districts, by roadsides and in dry forest undergrowth.

A small perennial herb with a woody rootstock, very variable in its leaves and the size of the flower spikes. All the S. Indian specimens seem, as the F. B. I. says, to be var. *mucronata*, C. B. Clarke, except a few which are var. *lophostachyoides*, but it is difficult to separate the vars. The corolla is white with brown spots on the palate.

12. LEPIDAGATHIS FASCICULATA, Nees; F. B. I. iv. 522; Bedd. Ic. t. 228.

N. Circars, Ganjam to Godavari, up to 4,000 ft. in the hills; S. Canara and Mysore, in forest undergrowth and in rocky places.

A herbaceous, soft, villous plant, the corolla white with purple spots.

30. Monothecium, Hochst.

Diffuse herbs. *Leaves* entire, lineolate. *Flowers* in small sessile dense, ovate or oblong, unilateral spikes; bracts and bracteoles linear-setaceous. *Calyx* 5-lobed, lobes equal, linear-setaceous. *Corolla* small, tube short, limb deeply 2-lipped. *Stamens* 2; anthers 1-celled, muticous. *Ovary* 2-celled, hairy; style slender; stigma minutely bifid. *Fruit* a small oblong capsule, the base solid. *Seeds* 4, compressed, truncate above, testa rugosely furrowed, retinacula obtuse.

MONOTHECIUM ARISTATUM, T. And.: F. B. I. iv. 524; Bedd. Ic. t. 269.

W. Ghâts, hills of S. Coimbatore at 1,200 ft. (Fischer), hills of Tinnevelly and Travancore, in dry open forests (Beddome, Venkoba Rao).

A branching procumbent often rooting small undershrub.

the corolla white with spots on the lower lip, the leaves ovate, pubescent, up to 1·5 in. long.

31. Rungia, Nees.

Erect or diffuse herbs or undershrubs. *Leaves* entire, usually id prominently lineolate. *Flowers* in dense terminal or axil-ry one-sided spikes; bracts in 2 or 4 rows, 2 of the rows ually without flowers, sometimes similar to but often different om the flowering bracts which usually have scarious hyaline rgins; bracteoles narrower than the flowering bracts. *Calyx* partite, lobes linear-lanceolate. *Corolla* small, blue or white; nb 2-lipped, the upper lip acute or emarginate, the lower ger 3-lobed. *Stamens* 2; anthers 2-celled, the cells usually perposed, the lower cell often with a white basal appendage. *ary* 2-celled; ovules 2 in each cell; style filiform; stigma nutely bifid. *Fruit* an ovoid or oblong capsule, the placentas d retinacula elastically separating from the base after dehis-nce. *Seeds* 4, compressed, orbicular, minutely tuberculate or ncentrically ridged.

rren bracts and flowering bracts similar or very nearly so; upper of corolla broad, emarginate :—

Spikes narrow and slender, quite 1-sided, on filiform peduncles: bracts lanceolate, mucronate, very narrowly scarious-margined: eaves lanceolate, acute, glabrous or puberulous, up to 1·5 in. long, 5 in. broad, main nerves 3–5 pairs ..... 1. *linifolia.*

Spikes slender, secund, one-sided, the peduncles short; bract anceolate, long-mucronate, narrowly scarious-margined, minutely ubescent; leaves variable, ovate or lanceolate or even linear, cute or acuminate, puberulous, up to 3·5 in. long, 1 in. broad, main nerves about 6 pairs ..... 2. *apiculata.*

Spikes broad and close with conspicuous broadly scarious-margined nearly orbicular bracts regularly imbricating, ciliate and apiculate, he bracteoles lanceolate, much smaller; leaves linear-oblong to anceolate, acute or subobtuse, nearly glabrous, up to 3 in. long, 7·5 in. broad, main nerves 3–6 pairs ..... 3. *repens.*

rren bracts and flowering bracts more or less different; upper lip corolla acute :—

Both kinds of bracts prominently white-scarious-margined, sub-imilar, the barren ones usually narrower :—

Spikes elongate, often 2–3 in. long, in panicles; leaves large and

thin, lanceolate, acuminate at both ends, up to 7 in. long, 2 in. broad, main nerves 8–12 pairs .....4. *Wightiana.*

Spikes short, rarely 1 in. long, in small clusters; leaves rather small and thick, ovate-lanceolate, acuminate, rounded at base, up to 3 in. long, 1 in. broad, main nerves 6–8 pairs.....5. *latior.*

Bracts rather large, scarious-margined, and usually coloured, prominently nerved :—

Barren bracts broadly attached at base to the rhachis of the spike and decurrent, imbricate in 2 series, one sided, flowering bracts not broadly attached, all shining, not mucronate, bracteoles small; leaves large, thin, oblong-lanceolate, acuminate at both ends, up to 6 in. long, 1·75 in. broad, the main nerves about 6–8 pairs .....6. *sisparensis.*

Barren bracts and flowering bracts thin and chaffy, attached at a point, the latter broader and broader-margined, both ciliate and long-mucronate, not markedly 1-sided, bracteoles lanceolate, small; leaves ovate, acute, rounded at base and then decurrent, up to 5 in. long, 2 in. broad, main nerves 7–9 pairs.....7. *laeta.*

Barren and flowering bracts very different, the former in 2 rows on one side of the spike, thick, elliptic, mucronate, narrowly margined, the latter with the flowers on the other side conspicuously hyaline-margined, obovate or orbicular, ciliate, variously clothed; leaves various, ovate or lanceolate or even linear-spathulate..8. *parviflora.*

1. RUNGIA LINIFOLIA, Nees; F. B. I. iv. 548. *Rostellularia gracilis*, Wt. Ic. t. 1541.

Mysore, at Aglatti, 3,500 ft. (Meebold in Hb. Calc.).

A very slender herb, erect but often rooting from lower nodes, the anthers not appendaged at base, the flowers said to be pale purple.

2. RUNGIA APICULATA, Bedd. Ic. t. 247; F. B. I. iv. 548.

W. Ghâts, hills of Madura and Tinnevelly, at 2,000–5,000 ft., in the beds of streams.

A slender undershrub, rooting at lower nodes, then erect, the corollas white with lilac spots, the seeds minutely tuberculate.

3. RUNGIA REPENS, Nees; F. B. I. iv. 549; Wt. Ic. t. 465.

N. Circars, in Godavari and Kistna; Deccan and N. Carnatic, in all Districts, west to the foot of the Ghâts.

A decumbent or erect, often rooting, herb with angular zigzag stems and conspicuous spikes often 4 in. long, the

bract-margins hyaline; flowers white, blue or pink; seeds concentrically ridged.

4. RUNGIA WIGHTIANA, Nees; F. B. I. iv. 546; Wt. Ic. t. 1549. *R. Arnottiana*, Wt. Ic. t. 1550.

W. Ghâts, Anamalais and hills of Tinnevelly and Travancore, 2,000–5,000 ft.

An erect undershrub with white flowers, the lower lip veined with lilac, the seeds minutely tuberculate.

5. RUNGIA LATIOR, Nees; F. B. I. iv. 546; Wt. Ic. t. 548. *R. longifolia* var. *latifolia*, C. B. Clarke; F. B. I. iv. 547.

W. Ghâts, Nilgiris, Anamalais and hills of Travancore, at about 3,000–6,000 ft.

A stout erect herb with white or pale blue flowers, the leaves reticulately nerved.

6. RUNGIA SISPARENSIS, T. And.; F. B. I. iv. 546.

W. Ghâts, Nilgiris, Anamalais and hills of Coimbatore and Malabar, at 3,000–4,000 ft.

A shrubby nearly glabrous plant with one-sided spikes and purplish bracts, the seeds minutely tuberculate in concentric lines.

7. RUNGIA LAETA, C. B. Clarke; F. B. I. iv. 546.

W. Ghâts, Pulney Hills and hills of Madura and Travancore, at 5,000–7,000 ft.

A shrubby plant with stout terete zigzag stems and white flowers with purple spots, the seeds minutely tuberculate in concentric lines.

8. RUNGIA PARVIFLORA, Nees; F. B. I. iv. 550 *p. p. longifolia*, Bedd. Ic. t. 266, *not of* Nees.

W. Coast and lower parts of W. Ghâts in Madura, Tinnevelly and Travancore, in dry forests in the low country.

A small soft herb with membranous leaves and small spikes of blue flowers, the fertile bracts glabrous except the ciliate margins. The small plant from Ceylon (Bedd. Ic. t. 266) with linear spathulate leaves has been found at Kolatoor in Travancore (Bourdillon).

Var. *pectinata*, C. B. Clarke *l. c.* *R. pectinata*, Nees; Wt. Ic. t. 1547. Larger and with larger and broader spikes and larger leaves, the floral bracts villous, the barren bracts prominently pectinately arranged.

All Districts, in fairly moist places, along streams and in

forest undergrowth and grassy pasture lands, up to 4,000 ft. in the hills.

Var. *muralis*, C. B. Clarke *l. c.* Much smaller, many branched, with very small ovate or orbicular leaves and rather long dense flowered secund strobiliform spikes, the barren bracts scarcely longer than the almost woolly fertile ones.

W. Coast, S. Canara to Travancore, on dry fields and on walls.

Var. *monticola*, Gamble. Erect, almost an undershrub, with strigosely villous stems and leaves, the latter ovate up to about 1 in. long; spikes short, about ·5 in. long, barren bracts long-mucronate, longer than the very white woolly fertile ones; flowers bright blue.

N. Circars, top of Mahendragiri at 4,500 ft. (Gamble, Fischer and Gage); Karimalai and Ayamalai hills of Malabar, at 4,000–5,000 ft. (Fischer), on rocks and among grass.

32. Dicliptera, Juss.

Erect or diffuse herbs. *Leaves* entire or undulate, lineolate. *Flowers* sessile or subsessile, in axillary or terminal clusters or panicles of cymes, often with imperfect flowers or flowerless bracts added, one or more enclosed within a pair of opposite inflorescence bracts; flowering bracts smaller and in often unequal pairs; bracteoles linear, about equalling the similar *calyx*-lobes. *Corolla* white, pink or red, purple-spotted; tube slender, limb 2-lipped, the upper lip narrow, entire or emarginate, the lower 3-lobed recurved. *Stamens* 2; anthers 2-celled, the cells superposed, muticous. *Ovary* 2-celled; 2 ovules in each cell; style filiform; stigma bifid. *Fruit* a clavate capsule with a solid stalk; placentas separating elastically from the base after dehiscence. *Seeds* ovoid or orbicular, compressed, verrucose or glandular-papillose, the papillæ sometimes glochidiate.

Flowers in slender divaricately branched panicles, the inflorescence bracts lanceolate but gradually reduced in size to minutely linear; flowering bracts and bracteoles minute, like the calyx-lobes, ·05–·1 in. long; leaves ovate, acuminate, membranous, nearly glabrous, up to 5 in. long, 2–3 in. broad, long-petioled ..... 1. *parvibracteata*.

Flowers in lax panicles with white-hairy branches, the inflorescence bracts linear oblong, mucronate, ciliate, gradually reduced to linear,

flowering bracts spathulate, bracteoles linear lanceolate as are the rather smaller calyx-lobes; leaves ovate, acuminate, minutely pubescent, up to 5·5 in. long, 3·25 in. broad, long-petioled ....2. *Beddomei.*

Flowers in clusters in few-flowered axillary umbels, bracts at the base of the umbel small, linear or spathulate, those below the clusters broadly ovate or subcordate, mucronate, reticulate, glabrous or pubescent, about ·5 in. in diam., bracteoles linear, shorter than the scarious ciliate calyx-lobes; leaves ovate or lanceolate, acuminate at both ends, membranous, up to 5 in. long, 2·5 in. broad, long-petioled

3. *zeylanica.*

Flowers in subcapitate pedunculed clusters, one or more together in the leaf-axils, bracts of the clusters small, linear, those of the flowers obovate-oblong, up to ·6 in. long, bracteoles linear like the calyx lobes; leaves ovate or elliptic, acuminate, acute or rounded at base, glabrous, up to 3·5 in. long, 1·5 in. broad, long-petioled

4. *cuneata.*

Flowers in dense terminal and axillary sessile or subsessile capitate cymes, the bracts obovate or oblanceolate, glandular-pubescent, unequal; leaves rhomboid- or elliptic-lanceolate, acuminate at both ends, undulate, membranous, up to 4·5 in. long, 2 in. broad, long petioled .....5. *bupleuroides.*

1. DICLIPTERA PARVIBRACTEATA, Nees; F. B. I. iv. 551.
   N. Circars, in Jaipur Hills (Beddome), Rampa Hills of Godavari, at 2,000 ft. (Gamble).
   A tall slender herb with elongate trichotomous cymes of apparently pink flowers.
2. DICLIPTERA BEDDOMEI, C. B. Clarke; F. B. I. iv. 551.
   Deccan, Nallamalai Hills of Kurnool (Beddome).
   A slender herb with flowers in rather short trichotomous cymes.
3. DICLIPTERA ZEYLANICA, Nees; F. B. I. iv. 552. *D. bivalvis* Nees; Wt. Ic. t. 1551.
   W. Ghâts, S. Canara to Travancore, in evergreen forests at 2,000–3,000 ft.
   A well-marked subscandent (Cooke) herb with conspicuous bracts and deep rose-coloured flowers, the seeds minutely glochidiate-papillose. The stems vary in pubescence from glabrous to densely white-woolly.
4. DICLIPTERA CUNEATA, Nees; F. B. I. iv. 552; Wt. Ic t. 1552.
   Deccan, Horsleykonda in Chittoor, at 4,000 ft. (Fischer)

hills of N. Coimbatore; Carnatic, hills of Salem, Trichinopoly and Madura to S. Travancore; W. Ghâts in Wynaad, about 3,000 ft.

A branching herb with, apparently, pink flowers, the seeds glochidiate-papillose.

5. DICLIPTERA BUPLEUROIDES, Nees. *D. Roxburghiana* var. *bupleuroides*, C. B. Clarke; F. B. I. iv. 554.

N. Circars, hill forests of Ganjam, about 1,500 ft. (Gamble, Barber).

An erect or tufted herbaceous plant with white flowers spotted with purple.

33. Ecbolium, Kurz.

Shrubs, nearly glabrous. *Leaves* entire. *Flowers* in dense terminal spikes; bracts large, leafy, imbricate, sometimes toothed; bracteoles small, narrow. *Calyx* 5-partite, connate below; lobes linear. *Corolla*-tube very long and slender; limb 2-lipped, the upper lip narrow, shortly 2-fid, the lower 3-lobed with broad pendent lobes. *Stamens* 2, attached near the top of the tube; anthers 2-celled, linear, parallel, muticous. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly 2-fid. *Fruit* an ovoid compressed capsule narrowed into a solid stalk. *Seeds* 4 or, more often, 2, large, compressed, tuberculate and scabrous, the retinacula long and curved.

ECBOLIUM LINNEANUM, Kurz; F.B.I. iv. 544; Wt. Ic. t. 463.

Deccan and Carnatic, inland to Coimbatore, otherwise chiefly from Madras southwards.

A low shrub with bluish-green corolla, the bracts obtuse or slightly acute, the spikes short and leaves small and pubescent. The leaves are used in medicine. Vern. *Hind.* Udu jati.

Var. *rotundifolium*, C. B. Clarke *l. c.* Leaves small, sessile, ovate; bracts shortly aristate.

Deccan, about Coimbatore (Wight).

Var. *laetevirens*, C. B. Clarke *l. c.* Leaves glabrescent, longer and larger and more acuminate, more prominently nerved; spikes long, up to 8 in., bracts broadly lanceolate, aristate.

W. Ghâts, in all Districts, at low levels, common.

Var. *dentatum*, C. B. Clarke *l. c.* Leaves glabrous, larger still

and much attenuate at base, spikes long, bracts ovate acuminate, dentate.

N. Circars, Ganjam to Godavari, in forest areas chiefly.

34. Justicia, Linn.

Herbs, undershrubs or shrubs. *Leaves* entire, usually lineolate with often very many raphides. *Flowers* sessile or subsessile, in spikes or panicles, rarely solitary; bracts various, bracteoles usually narrow, sometimes 0. *Calyx* 5- or 4-partite, the lobes narrow. *Corolla*-tube as long as or shorter than the limb; limb 2-lipped, the upper lip 2-lobed or sub-entire, the lower 3-lobed, the lobes imbricate in bud. *Stamens* 2; filaments often dilated; anthers 2-celled, the cells round or oblong usually more or less separate, the lower always with a white basal appendage. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly 2-fid. *Fruit* an ovoid or obovoid capsule, solid at base or not, often papery. *Seeds* 4, ovoid or suborbicular, more or less compressed, tuberculate rugose or echinate, not hygroscopically hairy.

Calyx-lobes 5, equal or nearly so :—

Erect shrubs; flowers large, in opposite clusters in elongate, often paniculate, spikes or racemes; capsule clavate, 4-seeded near the top, about 1 in. long; leaves oblong-lanceolate, obtusely acuminate at apex, acuminate at base, glabrous, up to 10 in. long, 3·5 in. broad, main nerves about 10 pairs ..... 1. *montana.*

Shrubs or herbs; flowers middle-sized, in continuous spikes with conspicuous imbricate bracts :—

Bracts white with green nerves, bracteoles similar :—

Flower spikes large and conspicuous, terminal, often panicled; bracts ·5–·75 in. long :—

Tall shrub, sometimes branching and decumbent; leaves petioled, ovate or lanceolate, acuminate, shortly attenuate at base, glabrous or villous beneath, entire or crenate-dentate, up to 6 in. long, 3 in. broad; capsule ·3–·5 in. long, clavate, pubescent, the seeds small, spinulose when wetted 2. *Betonica*

Low procumbent much-branched undershrub; leaves sessile, oblong, obtuse or emarginate, nearly glabrous, entire, up to 2 in. long, ·2–·5 in. broad; capsule ·75 in. long, clavate, puberulous, the seeds large, echinate when wetted 3. *nilgherrensis.*

Flower spikes small and slender; bracts about ·25 in. long, narrow; leaves ovate or oblong, sometimes linear, up to 1·5 in. long, ·4 in. broad; capsule ·5 in. long, pubescent, the seeds small, softly tuberculate when wet .....4. *trinervia.*

Bracts green; bracteoles different, often 0; the seeds softly echinate when wet :—

Stiff undershrubs with white bark and small leaves :—

Branches softly white-hairy; bracts elliptic, acute, about ·1–·2 in. long, bracteoles more oblong, usually longer, both minutely puberulous; spikes few-flowered; leaves oblong or spathulate, obtuse, ·5–·75 in. long; capsule ·5 in. long, softly pubescent .....5. *salsoloides.*

Branches glabrous except sometimes the uppermost branchlets; bracts orbicular or obcordate, short-apiculate, pubescent, ·15–·25 in. in diam., bracteoles linear or slightly elliptic, shorter; spikes short or elongate, many-flowered; leaves obovate or orbiculate, pubescent, up to 1 in. in diam.; capsule ·3 in. long, glabrous .....6. *tranquebariensis.*

Erect or diffuse herb with purplish bark and puberulous stems; leaves ovate or orbicular, obtuse or acute, petioled, up to 3 in. long, 2 in. broad; bracts orbicular-spathulate, bracteoles small linear, sometimes absent; spikes sometimes short, usually long and many-flowered; capsules obovoid, glabrous except at tip, ·25 in. long .....7. *glauca.*

Erect undershrubs with small or middle-sized flowers in axillary or terminal branched often paniculate spikes, the bracts inconspicuous and narrow :—

Flowers clustered in the spikes; bracts linear, very small, bracteoles 0; leaves short-petioled, narrowly lanceolate, glabrous, up to 5 in. long, 1 in. broad, main nerves about 7 pairs, not conspicuous; capsule glabrous, ·5 in. long, seeds unknown.....8. *Gendarussa.*

Flowers opposite in the spikes; bracts linear-lanceolate, bracteoles linear, small; leaves long-petioled, elliptic, acuminate at both ends, glabrous or pubescent, up to 8 in. long, 3 in. broad, main nerves 8–10 pairs, prominent; capsule 4-sided, clavate, very villous, ·7 in. long, seeds softly round-tuberculate 9. *wynaadensis.*

Herbaceous plant with flowers in lax axillary and terminal cymes, the bracts and bracteoles very small, linear; leaves broadly ovate, acute, obtuse or even subcordate at base and then acute into the long petiole, glabrous, minutely lineolate, up to 4 in. long, 3 in. broad, main nerves about 6–7 pairs; capsule 4-sided, clavate, villous, the seeds very villous, on jointed retinacula ....10. *glabra.*

Calyx-lobes 4; herbs and undershrubs with small flowers in terminal and axillary cylindric or linear spikes :—

Spikes cylindric, hairy; bracts and bracteoles as long as or longer than the calyx-lobes :—

Bracts and bracteoles very slender and long, with distant spreading long bulbous-based white hairs; calyx-lobes similar or only apiculate, their margins scarious; spikes up to 1·5 in. long, ·4 in. broad; leaves thin, ovate or elliptic, up to 2 in. long, the raphides irregular in the middle, transverse at the margins
11. *micrantha.*

Bracts and bracteoles linear, green, pectinately white-ciliate and scabrous-hirsute; calyx-lobes narrowly lanceolate, the margins only scarious, the raphides concentrically transverse and curved :—

Spikes scarcely 1 in. long, ·25 in. broad, usually pale; leaves elliptic lanceolate or linear, up to 2·5 in. long; white hairs of the bracts and bracteoles short and close.....12. *procumbens.*

Spikes up to 2 in. long, ·2 in. broad; leaves very small, orbicular, under ·7 in. in diam., the white jointed hairs long and spreading .....13. *serpyllifolia.*

Bracts elliptic-ovate or -lanceolate, the bracteoles narrower though similar; leaf raphides concentrically transverse :—

Erect, simple-stemmed, the leaves sessile, oblong, subobtuse; spikes up to 2·5 in. long, ·4 in. broad; bracts, bracteoles and calyx-lobes pectinately white-setulose .....14. *Notha.*

Diffuse and branching, the branches often angled or zigzag :—

Bracts more than ·1 in. broad, lineolate, bracteoles and similar calyx-lobes narrower, all scarious-margined and with soft whitish jointed hairs; leaves ovate or oblong even sometimes almost linear, up to about 1 in. long, main nerves about 6 pairs; plant pale when dry .....15. *simplex.*

Bracts less than ·1 in. broad, but broader than the bracteoles and calyx-lobes, more or less pectinately ciliate; leaves ovate or elliptic, up to 2 in. long, 1 in. broad, main nerves about 4 pairs; nearly black when dry.....16. *latispica.*

Spikes linear; bracts and bracteoles usually shorter than the calyx-lobes, all with a green midrib and scarious margins :—

Bracts, bracteoles and calyx-lobes obtuse at apex; leaves elliptic-oblong or -lanceolate, obtuse at apex, attenuate at base into the petiole, the raphides scattered, straight, parallel to the 4–5 main nerves; spikes slender, often very long, the whorls distant
17. *quinqueangularis.*

Bracts, bracteoles and calyx-lobes acute at apex :—

Bracts and bracteoles lanceolate nearly ·1 in. long but much shorter than the calyx-lobes, more or less scabrous :—

Prostrate and rooting many-branched herbs, sometimes becoming woody; spikes short; the leaves very small, orbicular or ovate, rarely over ·5 in. long, the raphides scattered ascending .....18. *prostrata.*

Erect tall slender branching herbs; spikes long and pale: leaves narrowly linear or lanceolate, up to 3 in. long, ·5 in. broad, the lower ones sometimes ovate, the raphides numerous ascending .....19. *Vahlii.*

Bracts and bracteoles usually very small and ovate, scarcely ·05 in. long, and with the calyx-lobes generally glabrous: spikes very slender up to 2 in. long; leaves usually thin, ovate, obtuse or acute, up to 2·5 in. long, 1·25 in. broad, the raphides irregular.....20. *diffusa.*

Bracts and bracteoles lanceolate, hirsute, a little shorter than the calyx-lobes, all with cuspidate long-ciliate tips and narrow scarious margins; leaves ovate or orbicular, obtuse, with strigose hairs above, villous beneath, up to nearly 2 in. long, 1 in. broad, the raphides irregular .....21. *orbiculata.*

1. JUSTICIA MONTANA, Wall.; F. B. I. iv. 525. *Hemichoriste montana*, Nees; Wt. Ic. t. 1538.

W. Ghâts, Mysore, Coorg, Wynaad, to the Anamalais and hills of Travancore, at low levels in evergreen forest.

An erect bush with thick stem, the corolla white with purple spots in the throat, the seed-testa corrugately wrinkled.

2. JUSTICIA BETONICA, Linn.; F. B. I. iv. 525.

All Districts, except very dry ones, on waste lands and in hedges.

An erect shrub, up to 4 ft. high, the corolla white, spotted with pink.

Var. *villosa*, C. B. Clarke. Stem and leaves beneath villous, bracts large.

N. Circars, Ganjam to Godavari, up to 4,500 ft. on Mahendragiri.

3. JUSTICIA NILGHERRENSIS, Wall.; F. B. I. iv. 526. *Adhatoda nilgherrensis*, Nees; Wt. Ic. t. 1544.

Carnatic, Melpat, S. Arcot. at 2,500 ft. (Barber); W. Ghâts, Nilgiris, in grass lands on the downs above 6,000 ft.

A low herb branching from a stout rootstock, the corolla whitish, spotted with red.

4. JUSTICIA TRINERVIA, Vahl; F. B. I. iv. 526.
W. Coast, S Canara and Malabar; Deccan, in Mysore.
A low procumbent herb, branching from a woody rootstock, the bracts and bracteoles often scarcely white, the corolla small.

5. JUSTICIA SALSOLOIDES, T. And.: F. B. I. iv. 530.
Carnatic, on very dry lands (Wight, G. Thomson).
A woody undershrub, the corolla densely pubescent without.

6. JUSTICIA TRANQUEBARIENSIS, Linn. f.; F. B. I. iv. 530.
Deccan and Carnatic, from Mysore southwards, on dry lands, up to 3,000 ft. in hilly country.
A woody undershrub with many stiff branches, the corolla slightly villous without, yellowish with purple spots.

7. JUSTICIA GLAUCA, Rottl.: F. B. I. iv. 529. *Gendarussa tranquebariensis*, Wt. Ic. t. 462, *not of* Nees.
All Districts, on waste lands and in dry forests, up to 2,000 ft.
A very variable herb, with pubescent branches, the corolla whitish with purple spots.

8. JUSTICIA GENDARUSSA, Linn. f.; F. B. I. iv. 532. *Gendarussa vulgaris*, Nees; Wt. Ic. t. 468.
W. Ghâts, valleys in the hills of Madura, cultivated and frequently found run wild.
An erect undershrub, the corolla white or rose with purple spots. The plant is used in garden hedges, and the leaves are much used medicinally. Vern. *Tel.* Nalla vavili; *Tam.* Karu nochi.

9. JUSTICIA WYNAADENSIS, Heyne; F. B. I. iv. 533. *Adhatoda wynaadensis* Nees; Wt. Ic. t. 1545.
W. Ghâts, from S. Canara and Coorg to Wynaad, E. Nilgiris and S. Malabar Hills, up to 3,000 ft., in evergreen forests and on waste lands.
An erect undershrub, the corolla with pink upper and brown-purple lower lip, the spikes long and slender with flowers in distant pairs.

10. JUSTICIA GLABRA, Koen.; F. B. I. iv. 535. *Rhaphidospora glabra*, Nees; Wt. Ic. t. 1554.

N. Circars, in Godavari; Deccan, in Kurnool and the Sandur Hills of Bellary, hills of Coimbatore and Salem; Carnatic, in Tinnevelly, in hedges and open forest.

An erect herb with slender divaricately branched inflorescence, the corolla pale yellow with purple spots.

11. JUSTICIA MICRANTHA, Wall.; F. B. I. iv. 536.

Deccan, in Bellary and Cuddapah to Chingleput.

An erect herb with trichotomous pale zigzag-branching stems and small rose-purple flowers, the small capsule pubescent.

12. JUSTICIA PROCUMBENS, Linn.; F. B. I. iv. 539.

W. Ghâts, from the slopes of the Pulneys southwards, W. Coast to Travancore.

A diffuse slender herb with many branches often rooting at the nodes, the flowers pale purple, the capsule pubescent at tip.

13. JUSTICIA SERPYLLIFOLIA, Gamble n. comb. *J. simplex* var. *serpyllifolia*, C. B. Clarke; F. B. I. iv. 539.

W. Coast, S. Canara and Malabar.

A small prostrate or straggling diffuse herb often rooting at the nodes, with slender zigzag branches, the spikes close and cylindrical.

14. JUSTICIA NOTHA, C. B. Clarke; F. B. I. iv. 537. *Rostellularia simplex*, Wt. Ic. t. 1542.

"Station not known (Wt.)." Clarke thinks it may be Malayan, but it is not recorded by Miquel.

15. JUSTICIA SIMPLEX, D. Don; F. B. I. iv. 539.

Deccan, Carnatic and W. Ghâts, usually in hilly country and even up to 7,000 ft., common.

A pale softly hairy herbaceous branching plant, the flowers pale pink or lilac, the capsules papery, villous at apex.

16. JUSTICIA LATISPICA, Gamble n. comb. *J. procumbens* var. *latispica*, C. B. Clarke; F. B. I. iv. 539. *Rostellularia procumbens*, Wt. Ic. t. 1539.

W. Ghâts, Nilgiri Hills above 5,000 ft., less common in Anamalais and Pulneys.

Almost an undershrub somewhat woody below, turning nearly black when dry, covered with scattered stiff strigose hairs, the flowers apparently pale lilac spotted white, the capsules papery, glabrous.

17. JUSTICIA QUINQUEANGULARIS, Koen.; F. B. I. iv. 536.
N. Circars, Biccávol in Godavari (Bourne).
A herbaceous undershrub with curving angular stems rooting at the nodes and giving erect branches, the flowers small, the capsules obovoid glabrous, the seeds with wavy subconcentric ridges.

18. JUSTICIA PROSTRATA, Gamble n. comb.; *J. diffusa*, Willd.; var. *prostrata*, C. B. Clarke, F. B. I. iv. 538.
Circars and Carnatic, from Ganjam southwards to S. Travancore, usually in sandy places near the coast, but sometimes inland to Salem, Trichinopoly and Coimbatore.
A small pale prostrate plant, the branches long and diffusely spreading from a stout rootstock sometimes almost woody, the flowers pale pink, the capsules small and minutely puberulous, the seeds minutely tuberculate. The leaves are small and usually orbicular or ovate, sometimes slightly lanceolate.

19. JUSTICIA VAHLII, Roth. *J. diffusa* var. *Vahlii*, C. B. Clarke; F. B. I. iv. 538.
Circars and Deccan, westwards to Bellary, up to 4,000 ft. in the hills.
A tall straggling narrow-leaved plant from a stout rootstock, the branches with long internodes angular and scabrous, the flowers pale with a reddish lip, the capsule pubescent, the seeds papillose.

20. JUSTICIA DIFFUSA, Willd.; F. B. I. iv. 538.
Circars, Deccan and Carnatic, also, but more scarce, W. Ghâts, up to 7,000 ft. in places.
A slender but sometimes in old plants quite woody branching herb, with pale flower spikes and leaves, the glabrous capsules small and pointed.

Var. *hedyotidifolia*, C. B. Clarke; F. B. I. iv. 538. *Rostellularia hedyotidifolia*, Nees; Wt. Ic. t. 1540. Leaves thicker and like other parts turning nearly black in drying; spikes broader and denser.
Deccan, on Horsleykonda, 4,500 ft. (Gamble); W. Ghâts, Nilgiris, Pulneys and hills of Travancore, about 3,000–5,000 ft.

21. JUSTICIA ORBICULATA, Wall. *J. diffusa* var. *orbiculata*. C. B. Clarke. F. B. I iv. 538.

W. Ghâts, Nilgiri and Pulney Hills, probably above 5,000 ft.; Shevaroy Hills of Salem (Bourne).

Almost an undershrub, soft and compact, with spreading dichotomous branches, the capsules nearly or quite glabrous, the seeds with lines of papillae.

35. Adhatoda, Nees.

Shrubs. *Leaves* entire. *Flowers* subsessile in the axils of opposite bracts in dense axillary and terminal often thyrsiform spikes; bracts herbaceous, bracteoles similar but usually narrower. *Calyx* 5-partite, the lobes imbricate, the 2 lowest often subconnate. *Corolla*-tube short; limb 2-lipped, the upper lip galeate subentire, the lower spreading, 3-lobed. *Stamens* 2, near the top of the corolla-tube; anthers 2-celled, the cells minutely apiculate at base. *Disk* cup-shaped. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma entire. *Fruit* a clavate capsule with a long solid base. *Seeds* 1 or 2, suborbicular, compressed, rugose.

Branches grey-pubescent; spikes stout, about 3 in. long; bracts elliptic, up to 1 in. long, about 7-ribbed; leaves lanceolate, acuminate at both ends, minutely puberulous, up to 8 in. long, 3 in broad, main nerves about 15 pairs, rather close ..... 1. *Vasica.*

Branches glabrous; heads short, up to 1 in. diam.; bracts ovate, up to ·5 in. long, obscurely 5-ribbed; leaves oblong-lanceolate, attenuate at both ends, minutely puberulous on the nerves, up to 6 in. long, 1·5 in. broad, main nerves about 8 pairs, rather distant.. 2. *Beddomei.*

1. Adhatoda Vasica, Nees; F. B. I. iv. 540.

   All plains Districts, perhaps wild in the N. Circars, elsewhere cultivated as a hedge-plant and run wild near villages.

   A dense shrub with a foetid scent, the flowers white with the throat barred with red or yellow. The leaves are used in native medicine, and an infusion of them is used as an insecticide. Vern. *Hind.* Arusha; *Ur.* Basung; *Tel.* Addasaram; *Tam.* Adatodai.

2. Adhatoda Beddomei, C. B. Clarke; F. B. I. iv. 540.

   Hills of S. Travancore, at 3,000 ft. (Beddome).

   A very large shrub, with rather small flowers in short heads; turns black in drying.

36. Dianthera, Linn.

Diffuse herbs or undershrubs. *Leaves* petioled, ovate or oblong. *Flowers* in terminal and sometimes axillary spikes or panicles; bracts and bracteoles small. *Calyx* 5-partite, the lobes narrow. *Corolla* small or middle-sized, the tube short; limb 2-lipped, the upper lip suberect, emarginate, the lower 3-lobed, pendent. *Stamens* 2; anther-cells 2, ellipsoid, subopposite or superposed, muticous. *Ovary* 2-celled, 2 ovules in each cell; style minutely hairy below, nearly bifid at tip. *Fruit* a clavate capsule with subcylindric solid base. *Seeds* 4, compressed, scabrous verrucose or subhispid.

DIANTHERA WALLICHII, Benth. in Gen. Pl. ii. 1114. *D. leptostachya*, C. B. Clarke; F. B. I. iv. 542. *Leptostachya Wallichii*, Nees; Wt. Ic. t. 1543.

W. Ghâts, hills of Tinnevelly.

An erect herb with slender divaricately branched panicles of small flowers, the leaves membranous, elliptic-oblong or -lanceolate, acuminate at both ends, up to 7 in. long, 2·5 in broad.

37. Rhinacanthus, Nees.

Shrubs, sometimes subscandent. *Leaves* entire. *Flowers* solitary or in small cymes in dense or divaricate panicles; bracts and bracteoles small, linear-lanceolate, shorter than the calyx. *Calyx* 5-lobed, the lobes narrow. *Corolla*-tube long, very slender, scarcely enlarged above; limb 2-lipped, the upper lip linear-oblong, entire or shortly 2-lobed, twisted or recurved, the lower broad, 3-lobed. *Stamens* 2, adnate near the top of the corolla-tube; anthers 2-celled, the cells superposed, muticous. *Disk* cupular. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma minutely 2-fid. *Fruit* a clavate capsule, contracted below in a long solid stalk. *Seeds* 1 or 2, orbicular, compressed, rugose.

RHINACANTHUS COMMUNIS, Nees; F. B. I. iv. 541; Wt. Ic. t. 464.

Almost all Districts, wild or cultivated, common on road-sides; also in forest glades especially in N. Circars, on the hills to 4,500 ft. as on Mahendragiri.

A shrubby plant reaching 5 ft. in height, with leaves sometimes reaching 8 in. long, 4 in. broad, the flowers white.

Var. *montana*, C. B. Clarke. Leaves ovate, very softly pubescent beneath and rounded at base.

Nilgiri Hills, near Coonoor (Wight).

38. Peristrophe, Nees.

Erect herbs. *Leaves* entire, lineolate. *Flowers* in terminal or axillary clusters, which are often in spreading lax panicles; bracts 1–4 together, decussate, longer than the calyces or the similar bracteoles. *Calyx* 5-partite; lobes linear-lanceolate. *Corolla*-tube slender, often twisted; limb 2-lipped, the upper lip subentire, the lower shortly 3-lobed. *Stamens* 2; filaments pubescent below; anthers 2-celled, cells linear or ovoid, one higher than the other, muticous. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly bifid. *Fruit* an ellipsoid stalked capsule, usually 4-seeded, the placentas not separating elastically. *Seeds* discoid, compressed, papillose.

A laxly paniculate spreading herb with angular hispid stems, the leaves chiefly near the base, ovate, acuminate, up to 2 in. long, pubescent; cymes trichotomous; bracts 2, unequal, opposite, linear or linear-spathulate, up to ·5 in. long; corolla pink, villous without, up to ·5 in. long; anther-cells short; seeds glochidiate-papillose

1. *bicalyculata.*

An erect herb or undershrub with nearly terete stems, the leaves chiefly near the top, elliptic, long-acuminate, subglabrous, up to 7 in. long, 2·5 in. broad, the flower-clusters in axillary or terminal 3–5-branched cymes; bracts 2, conspicuous, elliptic, glabrous or slightly villous, nerved, up to ·75 in. long; corolla pink, villous without, 2–2·5 in. long; anther-cells linear; seeds granular-papillose

2. *montana.*

1. Peristrophe bicalyculata, Nees; F. B. I. iv. 554.

   All Districts, common in forest undergrowth, in hedges and on waste land, even as a weed in gardens.

   A hispid herb 3–6 ft. high with unattractive very spreading flower panicles and rather small leaves.

2. Peristrophe montana, Nees; F. B. I. iv. 556; Wt. Ic. t. 1553.

   W. Ghâts, Wynaad, Anamalais, hills of Travancore and Tinnevelly, in evergreen forests at low levels up to 3,000 ft.

   A handsome erect undershrub with large leaves and flowers, the bracts often also coloured.

Graptophyllum hortense, Nees, is a glabrous shrub with crimson flowers and leaves mottled with white patches. It is largely cultivated in gardens and has occasionally run wild.

Family CXIV. VERBENACEAE.

Herbs, shrubs or trees. *Leaves* opposite or whorled, simple digitate or pinnate; stipules 0. *Inflorescence* cymose racemose or spicate, often paniculate; bracts usually small; flowers hermaphrodite, rarely polygamous, generally irregular, often brightly coloured, sometimes with coloured calyx or enlarged coloured involucre. *Calyx* inferior, gamosepalous, 5–4- rarely more lobed, persistent. *Corolla* gamopetalous; tube usually cylindric or dilated above, often curved; limb 2-lipped or subequally lobed, lobes 5–4, rarely more. *Stamens* usually 4 didynamous, rarely 2, rarely more, inserted on the corolla-tube; filaments free; anthers 2-celled. *Ovary* superior, sessile, 2–4 celled, entire or 4-lobed; ovules variously attached, 2, sometimes 1 in each cell; style terminal; stigma entire or bifid. *Fruit* drupaceous with bony pyrenes, or capsular, 1–4-celled; mesocarp usually fleshy; endocarp usually bony. *Seeds* erect or pendulous, separate in distinct cells; albumen usually 0, embryo straight, radicle inferior.

Inflorescence spicate, centripetal (the lowest flowers opening first):—
- Fruit with 2 or 1 1-seeded pyrenes:—
  - Spikes capitate ovoid or cylindric, calyx small; stamens 4.
    - Calyx truncate or obscurely lobed; fruit drupaceous, succulent ..... **1. Lantana.**
    - Calyx 2–4-lobed; fruit dry, hard ..... **2. Lippia.**
  - Spikes long, slender; calyx long, tubular:—
    - Stamens 4 didynamous ..... **3. Bouchea.**
    - Stamens 2 ..... **4. Stachytarpheta.**
- Fruit with 2 2-seeded pyrenes ..... **5. Priva.**
- Fruit with 4 1-seeded pyrenes; calyx tubular ..... **Verbena.**

Inflorescence cymose, centrifugal (the end flower opening first):—
- Cymes paniculate, drupes fleshy:—
  - Leaves simple:—
    - Corolla regular, stamens equal:—
      - Flowers 4-merous; drupe with 4 pyrenes .... **6. Callicarpa.**
      - Flowers 4–6-merous; drupe with 4-celled endocarp ..... **7. Tectona**

Corolla 2-lipped; stamens 4 didynamous :—
Drupe with 1 pyrene, normally 4-celled :—
Flowers small .....8. **Premna.**
Flowers large .....9. **Gmelina.**
Drupe with 4 pyrenes, 1–3 often suppressed 10. **Clerodendron.**
Leaves digitate; pyrene 1 .....11. **Vitex.**
Cymes capitate, bracts of the heads forming an involucre :—
Corolla 6–16- or more-merous; stamens long-exsert
12. **Symphorema.**
Corolla 5–6-merous; stamens included or shortly exsert
13. **Sphenodesme.**
Inflorescence capitate or shortly spicate, centripetal; calyx 5-partite, the lobes concave, imbricate, fruit capsular .....14. **Avicennia.**

1. Lantana, Linn.

Erect or subscandent, often rambling, often strong-smelling, pubescent or scabrous shrubs; branches 4-angled, sometimes prickly. *Leaves* simple, opposite or ternate, crenate, often rugose. *Flowers* in pedunculate capitate ovoid or cylindric spikes; bracts conspicuous, persistent, bracteoles 0. *Calyx* small, membranous, truncate or obscurely toothed. *Corolla*-tube cylindric, slender; limb salver-shaped; lobes 4 or 5, spreading. *Stamens* 4, didynamous, included in the corolla-tube and inserted at its middle; anthers oblong, the cells parallel. *Ovary* 2-celled; ovules 1 in each cell; style short; stigma oblique, subcapitate. *Fruit* a drupe with more or less fleshy mesocarp; endocarp hard, separating into 2 1-celled, 1-seeded pyrenes. *Seeds* exalbuminous; testa reticulate.

Erect shrubs, the stems not prickly :—
Leaves usually opposite, sometimes ternate :—
Lower bracts of the spike broadly ovate, usually abruptly acuminate, villous, 7-ribbed; spikes ·5–·75 in. long in flower, elongating in fruit; corolla-tube ·3 in. long; leaves ovate, acute, rounded and then cuneate at base, crenate, rugose above, usually white-pubescent beneath, up to 3 in. long, 1·5 in. broad
1. *indica.*
Lower bracts of the spike leafy, ovate, gradually acute, 5–7-ribbed, softly villous; spikes small, about ·5 in. long or less, in fruit up to 1 in.; corolla-tube short, ·15 in. long; leaves small, ovate or orbicular, obtuse or obtusely acute, crenulate, often

very white villous or tomentose, up to 1·5 in. long, but usually much less .....2. *Wightiana.*
Lower bracts of the spike lanceolate, 3-ribbed; spikes short, subumbellate, ·25 in. long in fruit, up to ·5 in.; corolla-tube long; leaves ovate-lanceolate, acuminate, rounded and then cuneate at base, scabrous above, crenulate, up to 3·5 in. long, 1·5 in. broad, the petiole long and slender .....3. *crenulata.*
Leaves usually ternate, sometimes only opposite, lanceolate, acute, cuneate at base, crenate, hispid-pubescent, up to 4 in. long, 1·5 in. broad; lower bracts of the spike ovate, cuspidate-acuminate; spikes ·5–1·5 in. long, elongate in fruit; corolla-tube very white-villous .....4. *trifolia.*
Straggling or climbing shrubs, the stems with many recurved prickles: bracts of the spike lanceolate 3–5-ribbed; spikes short, subumbellate, corolla-tube slender; scabrous-pubescent; leaves ovate or ovate-oblong, acute, cuneate rounded or cordate at base, crenate, rugose and scabrous, up to 4 in. long .....5. *aculeata.*

1. LANTANA INDICA, Roxb.; F. B. I. iv. 562; Wt. Ic. t. 1464.
Deccan, Carnatic and W. Ghâts, in hilly country up to 4,000 ft., often planted in gardens.
An erect shrub reaching 3–8 ft. high, the flowers pink or purplish with a yellowish tube.

2. LANTANA WIGHTIANA, Wall. *L. indica*, Roxb., var. *albiflora*, Wt.; F. B. I. iv. 562.
Carnatic and E. slopes of W. Ghâts, in or near the hills.
A woody shrub with very pale branches, small leaves and long slender peduncles, the flowers white.

3. LANTANA CRENULATA, Otto & Dietr.; F. B. I. iv. 563.
Coast of the Carnatic, Pulicat (Wight), Madras (Barber), perhaps introduced only.
An erect shrub with yellow and orange flowers, the leaves with long slender petioles, the peduncles up to 3·5 in. long.

4. LANTANA TRIFOLIA, Linn.; F. B. I. iv. 563.
Travancore (Heyne); Bangalore (Cleghorn), an introduced plant.
An erect hispid shrub resembling *L. indica*, the rather large ternate leaves subsessile.

5. LANTANA ACULEATA, Linn. *L. Camara*, Linn.; F. B. I. iv. 562.

W. Deccan and lower hills of W. Ghâts, up to perhaps 6,000 ft., especially common in Coorg and Wynaad, introduced from tropical America and run wild. The Lantana. A very aromatic plant with the scent of black currants, the corollas normally orange, but plants found in gardens have them of various hues, from white to dark red. The plant is most troublesome and measures for its destruction are often necessary though difficult (see Troup, 'Sylv. Ind. Trees,' ii, 780).

2. **Lippia**, Linn.

Shrubs or undershrubs, rarely herbs. *Leaves* opposite or ternate, rarely alternate, often aromatic, entire or toothed. *Flowers* small, in elongate or cylindric or capitate spikes; bracts small, imbricate, bracteoles 0. *Calyx* small, membranous, 2–4-lobed, ultimately 2-valved. *Corolla* small, salver-shaped, tube cylindric, straight or curved; limb oblique, 2-lipped, the upper lip bifid or emarginate, the lower 3-lobed. *Stamens* 4, didynamous, included at the middle of the corolla-tube; anthers ovate with parallel cells. *Ovary* 2-celled, ovules in each cell solitary; style short; stigma oblique, subcapitate. *Fruit* small, with a dry epicarp enclosed in the calyx valves; mesocarp granular; endocarp hard and bony, separating into 2 1-seeded pyrenes. *Seed* exalbuminous.

Prostrate, widely creeping and rooting, minutely hairy; leaves cuneate-spathulate, serrate towards the apex, up to 2 in. long; spikes dense, globose at first, afterwards elongating, peduncles usually single; bracts broadly obovate, apiculate ..... 1. *nodiflora.*

Erect and shrubby, softly white-strigose; leaves ovate, subobtuse, obtuse at base and somewhat decurrent, rugose, crenulate, up to 2 in. long ·75–1 in. broad; spikes dense, cylindric, elongating to 1 in. long, peduncles in one or two pairs; bracts ovate, apiculate, white-villous 2. *geminata.*

1. LIPPIA NODIFLORA, Mich.; F. B. I. iv. 563; Wt. Ic. t. 1463.
   All Districts, a weed of wet ground and grassy pastures, common.
   A prostrate herb with small white flowers.
2. LIPPIA GEMINATA, H.B. & K.; F. B. I. iv. 563.
   Nilgiris, on Sigúr Ghát, at 3,000 ft. (Lawson, Gamble); Anamalaís (Beddome). Wild Sage.

A strongly aromatic shrub of wet places, the flowers pink.

Lippia citriodora, H.B. & K. is the Lemon-scented Verbena, commonly planted in gardens, especially in the hills, where it sometimes grows to a considerable size. It is a native of S. America, and has very fragrant lanceolate leaves and small lilac flowers in terminal panicles.

3. Bouchea, Cham.

Herbs or undershrubs. *Leaves* opposite or subopposite, petioled, toothed. *Flowers* sessile or shortly pedicelled in terminal spikes or racemes; bracts small; bracteoles minute or 0. *Calyx* narrowly tubular, prominently 5-ribbed and 5-toothed, at length splitting longitudinally to the base between the 2 longer teeth. *Corolla*-tube slender, cylindric below, gradually widening; limb spreading, oblique, 5-lobed. *Stamens* 4, didynamous, included in the upper part of the tube; anthers oblong, the cells parallel. *Ovary* 2-celled; cells 1–2-ovuled; style slender; stigma oblique, subbilobed. *Fruit* enclosed in the calyx, of 2 elongate 1-seeded pyrenes, each with an interior basal hollow. *Seed* cylindric; testa thin; cotyledons oblong.

BOUCHEA HYDERABADENSIS, Walp.; F. B. I. iv. 564; Wt. Ic. t. 1462.

Deccan and Carnatic, in hilly country from Cuddapah to Tinnevelly.

A tall subshrubby plant with pink-purple flowers in long narrow spikes reaching 1 foot or more, ovate-lanceolate leaves deeply serrate in the upper three-fourths, cuneate and entire at the base, up to nearly 6 in. long, 2 in. broad, the hard pyrenes flattened on the inner face.

4. Stachytarpheta, Vahl.

Herbs or shrubs. *Leaves* usually opposite, toothed. *Flowers* in terminal spikes in the axils of bracts often closing an excavation of the rhachis in which they lie; bracts usually lanceolate, bracteoles 0. *Calyx* narrowly cylindric, shortly 4–5-lobed, often slit at the back when in fruit. *Corolla* salver-shaped; tube slender, cylindric, usually curved; limb spreading, 5-lobed, the lobes rounded. *Stamens* 2 perfect, included, with 2 or no

staminodes; filaments short; anthers with divaricate cells. *Ovary* 2-celled; ovule solitary in each cell, attached laterally near its base; style filiform; stigma capitate. *Fruit* cylindric, enclosed in the calyx-tube, separating into 2 hard 1-seeded usually plano-convex pyrenes. *Seeds* oblong; testa membranous; cotyledons fleshy.

Spikes slender, about ·1–·15 in. in diam., glabrous, the flowers blue; bracts lanceolate, acuminate, appressed; leaves elliptic-ovate, obtuse or acute, cuneate and decurrent at base, serrate or crenate-dentate except at base, up to 4 in. long, 1·5 in. broad, nearly glabrous
1. *indica.*

Spikes stout, about ·2–·25 in. in diam., very villous, the flowers pink; bracts lanceolate, long-acuminate and spreading; leaves ovate, acute, decurrent at base, crenate except at base, up to 5 in. long, 2·5 in. broad, softly tomentose beneath .....2. *mutabilis.*

1. STACHYTARPHETA INDICA, Vahl; F. B. I. iv. 564. *S. urticæfolia*, Bot. Mag. t. 1848.

Hills of the Carnatic, Shevaroys (Perrottet, Bourne), introduced probably.

A tall herb with long slender spikes of blue flowers, the leaves serrate.

Var. *jamaicensis*, Trimen. *S. jamaicensis*, Vahl; Bot. Mag. t. 1860.

All plains Districts, on roadsides, and in wet places, common and probably only naturalized.

A tall herb with very long slender spikes, the blue flowers in excavations of the rhachis, the leaves coarsely crenate-serrate.

2. STACHYTARPHETA MUTABILIS, Vahl.

Hills of the Deccan, Carnatic and W. Ghâts, in places, introduced to gardens from tropical America and run wild.

A tall herb, shrubby, with very long stout spikes and pink flowers (scarlet and rose, *Haines*).

5. Priva, Adans.

Erect herbs. *Leaves* opposite, thin, toothed. *Flowers* solitary, in simple terminal or axillary spikes or racemes; bracts small, narrow; bracteoles 0. *Calyx* tubular, becoming inflated in fruit,

5-ribbed, the ribs ending in short teeth. *Corolla*-tube cylindric, straight or curved; limb 5-lobed, spreading, slightly 2-lipped; base of tube with spiral lines. *Stamens* 4 didynamous, included; anther-cells parallel or slightly divergent; staminode minute or 0. *Ovary* 2-celled; ovules 2 in each cell; style long, filiform; stigma oblique, subclavate. *Fruit* enclosed in the loose dilated calyx-tube, separating when ripe into 2 2-seeded pyrenes, usually hollowed out on the inner side. *Seed* smooth; testa thin.

PRIVA LEPTOSTACHYA, Juss.; F. B. I. iv. 565. *Streptium asperum*, Roxb. Cor. Pl. t. 146.

Deccan and Carnatic, from the Kistna southwards and up to 3,000 ft., W. to E. slopes of the Ghâts, on old walls, rocks, etc. An erect herb with quadrangular stem, ovate obtuse long-petioled soft leaves truncate or subcordate at base, 3 in. long, and white flowers in very long racemes covered with hooked hairs, the pyrenes echinate.

6. Callicarpa, Linn.

Trees or shrubs, the young branches more or less densely stellately hairy. *Leaves* opposite, rarely ternate, entire or toothed. *Flowers* small, in axillary sessile or pedunculate many-flowered cymes; bracts linear, inconspicuous. *Calyx* small, campanulate, truncate or minutely 4-lobed, not enlarged in fruit. *Corolla* small, campanulate, purple or red; lobes 4; spreading. *Stamens* 4 equal, exserted; anthers oblong, glandular on the back, the cells parallel. *Ovary* imperfectly 2-celled, 2 ovules in each cell; style linear; stigma dilated, obscurely bifid. *Fruit* a small globose drupe, supported by the persistent calyx, containing 4 pyrenes with bony endocarp, each 1-seeded. *Seed* shortly oblong; albumen 0.

Under-surface of leaves with close hard finely stellate pale tomentum; leaves ovate to oblong, acuminate, acute or cuneate at base, entire or slightly denticulate, up to 10 in. long, 6 in. broad, calyx subtruncate ..... 1. *arborea.*

Under-surface of leaves with dense soft stellate grey or fulvous tomentum; leaves ovate or elliptic, acuminate, truncate or rounded, or cuneate at base, entire or serrate, up to 12 in. long, 8 in. broad; calyx shortly 4-lobed ..... 2. *lanata.*

1. CALLICARPA ARBOREA, Roxb.; F. B. I. iv. 567.
N. Circars, forests of the Eastern Ghâts, Ganjam to Godavari, in rather open spots.
A moderate-sized tree with lilac purple flowers and small black drupes. Bark brownish, rough; wood light brownish-white, even-grained. Vern. *Ur.* Boropatri.

2. CALLICARPA LANATA, Linn.; F. B. I. iv. 567. *C. Wallichiana* Walp.; Wt. Ic. t. 1480.
W. Ghâts, in all Districts, at 2,000–4,000 ft., especially at the edges of clearings.
A small tree or large shrub reaching 25 ft. high, the flowers purple, the small drupes black. Bark brown, rough: wood pâle brown, smooth, moderately hard, used for carving and the legs of cots. Vern. *Tam.* Vettilai patta: *Mal.* Thin perivelam.

7. Tectona, Linn. f.

Trees, stellately tomentose. *Leaves* large, opposite or whorled, entire, petioled. *Flowers* numerous, in dichotomous cymes in large terminal panicles; bracts small, narrow. *Calyx* campanulate, shortly 5–6-lobed, enlarged and bladder-like in fruit. *Corolla* small, white; tube short; limb with 5–6 short subequal spreading imbricate lobes. *Stamens* 5–6, inserted near the base of the corolla, equal, exserted; anthers ovate or oblong with distinct parallel cells. *Ovary* fleshy, 4-celled, each cell 1-ovuled; style linear; stigma shortly bifid. *Fruit* a drupe enclosed in the enlarged calyx; exocarp spongy or nearly dry; endocarp bony thick, 4-celled. *Seeds* erect, oblong; testa membranous; albumen 0; cotyledons fleshy and oily; radicle short.

TECTONA GRANDIS, Linn. f.; F. B. I. iv. 570; Roxb. Cor. Pl. t. 6; Bedd. Fl. t. 250; Brand. For. Fl. t. 44.
N. Circars, forests on both sides of the Godavari; Deccan and Carnatic in Hill forests in all forest Districts, but in scattered localities; W. Ghâts, in all Districts, but most especially in the Wynaad, the Anamalais and in dry forests at low levels in Cochin and Travancore. It has been much planted, the most notable plantation being that of Nilambur in Malabar. Teak.
A very large deciduous tree with quadrangular stems,

covered, like the inflorescence and under-surface of the leaves, with tawny stellate tomentum. The leaves are very large as are the flower panicles. Bark light brown or grey; wood moderately hard, golden yellow, darkening on exposure, very valuable and in great demand as the principal timber of India, both for local use and for export. Vern. *Hind.* Sagun; *Ur.* Singuru; *Tel.* Teku; *Tam.* and *Mal.* Thekku; *Can.* Tadi.

8. Premna, Linn.

Trees or shrubs, sometimes climbing, rarely herbaceous undershrubs. *Leaves* opposite or sometimes whorled, entire or toothed. *Flowers* in corymbose panicled or thyrsoid terminal cymes; bracts small, narrow, bracteoles 0. *Calyx* small, campanulate, truncate 2-lipped or shortly 2–5-lobed, somewhat enlarged in fruit. *Corolla* small; tube short, often villous within; limb 2-lipped, 5- or subsequently 4-lobed. *Stamens* 4, didynamous, inserted below the throat of the corolla-tube, rarely exserted; anthers ovate or rounded, the cells parallel or divergent. *Ovary* 2- or 4-celled, 4-ovuled; style linear; stigma shortly bifid. *Fruit* a small drupe, seated on the calyx, globose or obovoid, mesocarp thin, fleshy, endocarp of 1 pyrene, rugose or verrucose, often with a central cavity. *Seeds* oblong, testa thin, albumen 0, cotyledons flat.

Climbing shrubs:—

Leaves coriaceous, glabrous, ovate or ovate-oblong, abruptly cuspidate-acuminate at apex, rounded or cordate at base, entire or shortly serrate, prominently 4–7-nerved, the nerves and reticulations raised beneath, up to 8 in. long, 4 in. broad; corymbs large and spreading, often 8 in. in diam.; calyx truncate, scarcely lipped ..... 1. *coriacea.*

Leaves membranous:—

Leaves densely softly villous beneath, puberulous above, ovate, acute or shortly acuminate at apex, truncate or cordate at base, entire, 6–8-nerved, the nerves slightly raised beneath, up to 7 in. long, 4·5 in. broad; corymbs up to 4 in. in diam.; calyx truncate or very slightly waved ..... 2. *villosa.*

Leaves merely villous along the nerves beneath, otherwise glabrous, ovate-oblong, abruptly acuminate, rounded at base,

entire, about 3–5-nerved, up to (when young) scarcely 4 in. long; corymbs about 2 in. in diam. .....3. *paucinervis.*

Erect trees or shrubs :—

Cymes in panicles :—

Calyx deeply 2-lipped, enlarged and prominent in fruit, the upper lip sometimes minutely 3-lobed; panicles small, under 1 in. broad, dense; leaves ovate, acuminate, truncate or subcordate at base, nearly glabrous, entire, 4-nerved, up to 4 in. long, 2 in. broad, petiole ·5–1 in. long; drupe obovoid .....4. *corymbosa.*

Calyx shortly 5-lobed, somewhat enlarged and widened in fruit; panicles pyramidal, up to 4 in. broad; leaves ovate, acuminate, obtuse or cordate at base, densely (like the branches and inflorescence) tawny-yellow stellately tomentose, up to 8 in. long, 5 in. broad, petiole 1–2 in. long; drupe subglobose..5. *tomentosa.*

Cymes in corymbs :—

Corymbs terminal to main branches only, broad; calyx obscurely 2-lipped, one lip 2-lobed, the other 3-lobed or subentire, in fruit saucer-shaped :—

Leaves oblong-elliptic or oblanceolate, abruptly acuminate at apex, somewhat rounded at base, glabrous, entire or slightly serrate, 5–8-nerved, the nerves looped and, with the transverse nervules, prominent beneath, up to 9 in. long, 4·5 in. broad, petiole ·6 in.; drupe globose.....6. *glaberrima.*

Leaves ovate, acuminate, rounded at base, pubescent (especially beneath) and gland-dotted, entire or undulate, 6–8-nerved and with subparallel transverse nervules, up to 8 in. long, 4·5 in. broad, petiole 1–4 in.; drupe globose ....7. *flavescens.*

Leaves broadly elliptic-ovate, obtuse at apex with a very short point, rounded at base, glabrous or slightly villous beneath, entire or dentate towards the apex, 4–5-nerved, up to 4 in. long, 2·5 in. broad, petiole about ·5 in.; drupe globose or obovoid.....8. *serratifolia.*

Corymbs terminal to side branchlets as well as main branches, small; calyx 2-lipped, the upper lip 2-, the lower 3-lobed; leaves ovate, shortly acuminate at apex, obtuse and then cuneate at base, glabrous or pubescent, entire, about 4-nerved, up to 3 in. long, 2 in. broad, petiole ·5–1·5 in.; drupe globose ..9. *latifolia.*

Corymbs lateral on old wood or sometimes terminal on side branchlets; calyx campanulate but very shallow in fruit; leaves ovate-lanceolate, acuminate, cordate or truncate at base, serrate, up to 3·5 in. long, 1·5 in. broad; drupe obovoid

10. *procumbens.*

Cymes in thyrsoid panicles, terminal; calyx obscurely 2-lipped, upper lip 2-, lower 3-lobed; leaves ovate, acuminate, obtuse at base, entire or serrate in the upper half, glabrous or slightly pubescent, 4–5-nerved, up to 3·5 in. long, 2 in. broad, petiole slender, ·5–1 in. long, grooved: drupe obovoid, verrucose-tubercular
11. ***Wightiana.***

Small herbaceous plant from a woody rootstock, the flowers in small corymbs; calyx obscurely 2-lipped, the upper lip 2-, the lower 3-lobed; leaves sessile obovate, coarsely crenate or serrate in the upper half, pubescent on the nerves, up to 4·5 or more in. long, 3 in. broad; drupe globose.....12. ***herbacea.***

1. PREMNA CORIACEA, C. B. Clarke; F. B. I. iv. 573.
   W. Ghâts, from Mysore and Canara to Cochin and Travancore, at low levels, up to 3,000 ft.
   A large climber with pale brown bark with corky lenticels, the corymbs purplish, the flowers white. The petioles have a cup-shaped scar at their base.
2. PREMNA VILLOSA, C. B. Clarke; F. B. I. iv. 573.
   Deccan, Sandûr Hills of Bellary, at 2,000 ft. (Brougham, Gamble); W. Ghâts, Coorg and Wynaad, at 3,000 ft. (G. Thomson, Beddome).
   A large climber with pale brown smooth bark, white flowers and hairy leaves with long petioles.
3. PREMNA PAUCINERVIS, Gamble, *n. comb.* *P. purpurascens*, Thw., var. *paucinervis*, C. B. Clarke; F. B. I. iv. 574.
   W. Ghâts, Anamalais at 3,000 ft. (Beddome).
   A gigantic climber and epiphyte (Beddome), the flowers supposed to be red. A very little known species.
4. PREMNA CORYMBOSA, Rottl. & Willd.; F. B. I. iv. 573. *P. cordifolia*, Wt. Ic. t. 1483, *not of* Roxb.
   Deccan, forests about Kodûr in Cuddapah; Carnatic, Nellore, Chingleput and Madras to the Javadis, in hedges and among bushes.
   A shrub from 3 to 6 ft. high with slender branches and yellowish flowers. Vern. *Tel.* Pomanti, Pedda narva.
5. PREMNA TOMENTOSA, Willd.; F. B. I. iv. 576; Wt. Ic. t 1468; Bedd. Fl. t. 251.
   N. Circars, Deccan and Carnatic down to S. Travancore in deciduous forest, up to about 4,000 ft., common.
   A moderate-sized deciduous tree with greenish-yellow

flowers. Bark light greyish-brown; wood light brown smooth and close-grained, of good quality but little used. Vern. *Tel.* Nagal, Narvu; *Tam.* Kolakatta; *Kan*, Ije.

6. **Premna glaberrima**, Wt. Ic. t. 1484; F. B. I. iv. 577 (*by error integerrima*).

W. Ghâts, hills of Tinnevelly (Wight).

A shrub, 6–8 ft. high, quite glabrous and with characteristic distantly nerved leaves, the branchlets pale brown.

7. **Premna flavescens**, Ham.; F. B. I. iv. 578.

N. Circars, Rampa Hills of Godavari (V. Narayanswami).

A large tree with large soft leaves and large spreading corymbs of whitish flowers.

8. **Premna serratifolia**, Linn. *P. integrifolia*, Linn.; F. B. I. iv. 574; Wt. Ic. t. 1469.

Plains of S. Carnatic, near the coast.

A small tree or shrub with the trunk and older branches with opposite spines, the greenish-yellow flowers unpleasantly scented. Bark thin, pale; wood light brown, scented. Vern. *Tam.* Pay minnay.

9. **Premna latifolia**, Roxb.; F. B. I. iv. 577; Wt. Ic. t. 869.

N. Circars and Carnatic to Tinnevelly, near the coast, in dry forest areas.

A small tree reaching 25 ft. in height, the leaves usually drying blue or black, the flowers greenish-white. Vern. *Tel.* Pedda nella kura.

Var. *mollissima*, C. B. Clarke. Leaves softly pubescent beneath usually smaller as are the corymbs.

Deccan, in deciduous forest.

Var. *viburnoides*, C. B. Clarke. Leaves ovate, rhomboid at base, glabrate, drying green.

Carnatic, Madras and S. Arcot to Tinnevelly; W. Coast at Cochin.

10. **Premna procumbens**, Moon; F. B. I. iv. 580.

Tinnevelly, at Mundanthorai, 675 ft. (Fischer).

A small undershrub with yellowish terete branches and flowers in small usually lateral corymbs.

11. **Premna Wightiana**, Schauer; F. B. I. iv. 578. *P. thyrsoidea*, Wt. Ic. t. 1485; F. B. I. iv. 579.

W. Ghâts, Pulneys and hills of Tinnevelly and Travancore, at low levels.

A small tree or large shrub with yellowish-brown branches and white flowers very long-hairy in the throat. Vern. *Tam.* Pinja.

12. PREMNA HERBACEA, Roxb.; F. B. I. iv. 581.

N. Circars, forests of Ganjam (Barber), hills of Vizagapatam at 2,500 ft. (A. W. Lushington); W. Ghâts, Mudumalai in S. E. Wynaad (Beddome), usually on clay in open ground, especially where fires have been.

A small plant, a few inches high only, with the leaves pressed close to the ground, the flowers small and white.

9. Gmelina, Linn.

Trees or shrubs, unarmed or armed with axillary divaricate spines (abortive branchlets). *Leaves* opposite, entire toothed or lobed. *Flowers* large, yellow or brownish-yellow, often tomentose, in dense or lax sessile or pedunculate racemes along the branches of a terminal panicle; bracts usually small, sometimes large and leafy. *Calyx* campanulate, shortly 4–5-lobed or subentire, persistent. *Corolla* obliquely campanulate or funnel-shaped; limb oblique spreading 4–5-lobed. *Stamens* 4, didynamous, inserted below the throat, included; anthers pendulous, with oblong subseparate cells. *Ovary* 4-celled, the cells 1-ovuled; style slender; stigma shortly bifid. *Fruit* a succulent drupe, the endocarp bony, 2–4-celled, usually with a conical hollow in the middle open on one side. *Seeds* oblong; testa thin; albumen 0; cotyledons fleshy.

An unarmed tree; leaves large, deltoid-ovate, acuminate, cordate and then slightly decurrent at base, fulvous-tomentose beneath, up to 9 in. long, 8 in. broad, long-petioled; calyx-lobes 5; corolla brownish-yellow densely pubescent without, tube stout ..1. *arborea.*

Shrub, often spinous from divaricate abortive branchlets; leaves small, ovate, often irregularly lobed, glabrous but glaucescent beneath with minute round glands, up to 1·5 in. long, 1 in. broad, short-petioled; calyx-lobes 4; tube with large glands; corolla bright yellow, pubescent without, tube slender.....2. *asiatica.*

1. GMELINA ARBOREA, Roxb. Cor. Pl. t. 246; F. B. I. iv. 581; Wt. Ic. t. 1470; Bedd. Fl. t. 253.

All Districts, in deciduous forests and up to 5,000 ft. in the hills though sporadic and not abundant; often planted in avenues and gardens.

A large or moderate-sized deciduous tree with handsome **panicles of** brownish-yellow flowers and a large yellow **fleshy drupe.** Bark smooth, white or whitish-grey; wood greyish-white, glossy, smooth and even grained, useful for **planking**, furniture and many other purposes and not **liable to** warp or contract. Vern. *Hind.* Gumhar; *Ur.* **Gambari**; *Tel.* Gumar tek; *Tam.* Gumadi, Umi; *Kan.* **Shivani**; *Mal.* Kumbil.

2. **GMELINA ASIATICA.** Linn.: F. B. I. iv. 582; Wt. Ill. t. 174. *G. parvifolia.* Roxb. Cor. Pl. t. 162.

N. Circars. E. Deccan and Carnatic in scrub forest, **sometimes** planted.

A large straggling shrub, sometimes climbing, spinescent On poor land, it is often with very small leaves. Bark brownish-white, thin; wood hard, grey, used for fuel and **fencing.** Vern. *Tel.* Gumadi; *Tam.* Kumil.

G. Hystrix, Schult., is a thorny shrub, frequently met with in **gardens, a native** of Tenasserim Siam and Malaya. It has large **yellow flowers** and conspicuous large coloured bracts.

10. Clerodendron, Linn.

Trees and shrubs, sometimes straggling or climbing. *Leaves* **opposite, rarely** verticillate, simple, entire or toothed or lobed. *Flowers* **small** or large, in axillary cymes or terminal panicles, **often leafy below**; bracts conspicuous or small; bracteoles 0 or very **small.** *Calyx* campanulate, rarely tubular, truncate 5-lobed or **almost** 5-partite, persistent often accrescent, often coloured in **fruit.** *Corolla* salver-shaped or funnel-shaped; tube usually **long and slender**, limb more or less oblique with 5 spreading **lobes.** *Stamens* 4, didynamous, long-exserted; filaments filiform, **involute** in bud; anthers ovate or oblong, the cells parallel. *Ovary* **imperfectly** 4-celled, 1-ovuled; style filiform; stigma **shortly bifid.** *Fruit* a globose drupe, succulent or rarely dry, **4-grooved, separating** into 4 pyrenes of which 1–3 sometimes **suppressed**; endocarp bony or crustaceous. *Seeds* oblong or **pyriform, albumen** 0; cotyledons fleshy.

Corolla irregularly salver-shaped, 1·5 *in.* long or less :—

Panicles axillary, occasionally also terminal; flowers white :—

Calyx minutely toothed, in fruit enlarged, subtruncate, at the **base of the** spongy drupe : —

Leaves obovate or elliptic, even orbicular, obtuse or emarginate, opposite or rarely ternate, up to 2 in. long, 1·5 in. broad
1. *inerme.*

Leaves elliptic, acute or acuminate, frequently ternate, up to 3 in. long.....*neriifolium.*

Calyx lobed about half-way down, the lobes caudate-acuminate, in fruit enlarged and rigid; leaves ovate-deltoid, sinuate or serrate, up to 3 in. long, and broad, puberulous beneath
2. *Phlomidis.*

Panicles terminal :—

Calyx subtruncate, the lobes very short; corolla blue to white: ·5–1·5 in. long, obovate to lanceolate, often coloured; leaves elliptic or oblong, acuminate, coarsely serrate, up to 12 in. long, 6 in. broad, but usually smaller.....3. *serratum.*

Calyx deeply 5-lobed, the lobes lanceolate, acute; corolla pinkish white; bracts small: leaves ovate or almost orbicular, acuminate, cordate or obtuse at base, entire denticulate or serrate, villous or tomentose, up to 10 in. long, 8 in. broad.....4. *infortunatum.*

Calyx small, with subulate lobes; panicle dense, corymbose: corolla white to purple, usually double; leaves ovate, acute, subcordate, up to 6 in. in diam..... *fragrans.*

Corolla narrowly funnel-shaped, 3 in. or more long; calyx ·5 in. long, lobes lanceolate, acute; panicle lax, terminal, much elongate; leaves narrowly lanceolate, subsessile, subentire, up to 9 in. long, 1·5 in. broad ..... 5. *Siphonanthus.*

1. CLERODENDRON INERME. Gaertn; F. B. I. iv. 589.

Sea-coasts on both sides, in tidal forests, often planted in gardens, and so perhaps run wild inland.

A straggling shrub, with corolla-tube usually 1-1·5 in. long and a dry brown drupe. Vern. *Hind.* Batraj; *Tel.* Pisung; *Tam.* Pinchil, Sangam.

2. CLERODENDRON PHLOMIDIS, Linn. f. *C. phlomoides*, Willd.; F. B. I. iv. 590; Wt. Ic. t. 1473.

N. Circars, Deccan and Carnatic, usually in hedges and near villages.

A large often rambling shrub with hoary pubescence on the branchlets, the flowers sometimes pink, the corolla-tube ·75–1 in. long, the drupe obovoid nearly dry. Bark of the branches nearly white with brown lenticels. Frequently used in medicine. Vern. *Hind.* Urni: *Tel.* Telaki; *Tam.* Taludala.

3. CLERODENDRON SERRATUM, Spreng.; F. B. I. iv. 592; Wt. Ic. t. 1472.

All Forest Districts, up to 5,000 ft. in the hills, chiefly in rather damp places.

A shrub, usually herbaceous but occasionally woody, with 4-angled stems, pretty blue flowers in a long cylindrical thyrsus and a 4-lobed purple drupe, the corolla-tube short. Often used in medicine. Vern. *Hind.* Barangi; *Tam.* Chiru dekku.

4. CLERODENDRON INFORTUNATUM, Linn.; F. B. I. iv. 594; Wt. Ic. t. 1471.

All Districts, especially the moister ones and up to 6,000 ft. in the hills; common in forest undergrowth, in mango and other topes and near villages.

A large tawny-villous shrub, occasionally a small tree up to 30 ft. high (Bourdillon) with 4-angled branches and large terminal panicles of pedunculate cymes. In the Southern Districts the leaves are cordate tomentose and entire, proceeding northwards they become less cordate, less tomentose and gradually serrate. It reproduces well by suckers. It is frequently used in medicine. The drupe is black, in an enlarged pink calyx. Vern. *Hind.* Bhánt; *Ur.* Bania; *Tel.* Bockada; *Tam.* Perugilai; *Mal.* Paragu, Vatta perivelam.

5. CLERODENDRON SIPHONANTHUS, R. Br.; F. B. I. iv. 595; Wt. Ill. t. 173.

Deccan and Carnatic, in grass lands and near streams; W. Coast Districts.

A tall shrub with erect hollow stems up to 6 ft. high or more, conspicuous for its very long-tubed flowers and blue drupes in a persistent red enlarged calyx. Vern. *Hind.* Barangi.

C. neriifolium, Wall., is a Malay coast shrub, occasionally found in cultivation and run wild. *C. fragrans*, R. Br., is a Chinese shrub with sweet-scented double flowers and bad-smelling leaves, often met with in gardens and run wild in topes and on roadsides. Some other species are also to be found in gardens, the most conspicuous of which is the climbing *C. Thomsonae*, Balf., an African plant with a white calyx and crimson corolla.

11. Vitex, Linn.

Trees or shrubs. *Leaves* opposite, digitately 3–7-foliolate, sometimes 1-foliolate; leaflets usually entire sometimes dentate. *Flowers* in sessile or pedunculate cymes forming terminal and axillary or wholly axillary panicles or corymbs; bracts small, often caducous. *Calyx* campanulate or tubular-funnel-shaped, truncate or shortly 5-lobed. *Corolla* small, 2-lipped; tube usually short; upper lip of 2, lower of 3 lobes, the midlobe much the longest. *Stamens* 4, didynamous, usually exserted; anther-cells at first parallel and pendulous afterwards divaricate, always attached at the tip only. *Ovary* 2–4-celled, 4-ovuled; style filiform; stigma bifid. *Fruit* a globose ovoid or obovoid drupe supported by the somewhat enlarged calyx; mesocarp fleshy; endocarp a bony pyrene, normally 4-celled and 4-seeded but often with some cells suppressed, the centre and base sometimes hollowed. *Seeds* obovate or oblong; testa rather thick; albumen 0; cotyledons fleshy.

Inflorescence terminal, with occasional additional branches in upper leaf-axils :—

Shrubs or small trees; leaves membranous, white- or grey-pubescent beneath, entire or sometimes toothed :—

Leaves 1–3-foliolate, the leaflets sessile, obovate-oblong, the middle one cuneate at base, usually subobtuse but sometimes acute at apex; panicles 1–5 in. long; calyx-teeth very short ..... 1. *trifolia*

Leaves 3–5-foliolate, the leaflets lanceolate, all with petiolules, the middle one long; panicles up to 12 in. long; calyx-teeth triangular ..... 2. *Negundo.*

Trees; leaves chartaceous or coriaceous, not grey-pubescent beneath :—

Leaves 3-, occasionally 5-foliolate, the leaflets sessile or subsessile, the side ones lanceolate the middle one lanceolate or oblanceolate, acuminate, all nearly glabrous above, thinly pubescent beneath, up to 6 in. long; petiole angular or winged with an auricled base; panicles with racemose branches of small grey-pubescent cymes, bracts small and caducous; corolla very small, scarcely ·2 in. long; drupes small, ·2 in. in diam. ..... 3. *altissima.*

Leaves 3-, sometimes 4- or 5-foliolate, the leaflets sessile, ovate or elliptic, abruptly acuminate, rounded at base, broad, glabrate above, fulvous pubescent beneath, up to 9 in. long; petiole not

winged; panicles pyramidal, fulvous, with short racemose branches, bracts foliaceous, conspicuous and persistent; corolla ·4–·5 in. long; drupe shining, about ·4 in. in diam...4. *pubescens.*

Inflorescence axillary :—

Flowers in slender lax panicles of dichasia, often 8 in. long; leaves submembranous, 3-foliolate, the leaflets petioluled, elliptic or lanceolate, acuminate, nearly glabrous, but yellow-gland-dotted beneath, entire or (when young) coarsely serrate, petiole in young trees frequently winged; corolla ·3 in. long, puberulous and glandular; drupe obovoid about ·3–·4 in. long.....5. *peduncularis.*

Flowers in divaricate corymbose dichasia about 4 in. long; leaves coriaceous, 3–5-foliolate, the leaflets long-petioluled, elliptic or lanceolate, obtuse or acuminate, glabrous except along the midrib beneath, entire or sometimes shortly dentate near the tip, petiole not winged; corolla with large lower lip, long-villous on the palate; drupe ellipsoid, ·75 in. long, succulent, the pyrene with large basal cavity and usually 1-seeded .....6. *Leucoxylon.*

1. VITEX TRIFOLIA, Linn. f.; F. B. I. iv. 583.

Coast Districts, especially the West in S. Canara and Malabar.

A shrub, rarely more, sometimes quite small, the flowers pale purple, the leaves often with only 1 leaflet which may then be ovate or orbicular, up to 2 in. long, 1·5 in. broad. Vern. *Tam.* Nir nocchi; *Tel.* Vavili.

2. VITEX NEGUNDO, Linn.; F. B. I. iv. 583; Wt. Ic. t. 519.

All Districts, in the dry region, up to 5,000 ft. in the hills, on waste lands round villages, on roadsides and the banks of streams, common.

A large shrub, rarely a small tree, with bluish-purple flowers and narrow long-acuminate leaflets. Bark thin, grey; wood greyish-white, hard. The plant is used in medicine. Vern. *Hind.* Nisinda, Shambalu; *Ur.* Beyguna; *Tel.* Vavili; *Tam., Mal.* Nocchi.

3. VITEX ALTISSIMA, Linn. f.; F. B. I. iv. 584; Wt. Ic. t. 1466; Bedd. Fl. t. 252. *V. alata*, Heyne; F. B. I. iv. 584.

All Forest Districts, in deciduous and dry forests of the Deccan and Carnatic, also on W. coast, sometimes but scarce in evergreen forests, up to 4,000 ft. in hilly country.

A large and lofty tree with white flowers tinged with blue or violet. Bark yellowish-grey; wood grey to yellowish-

brown, hard and close-grained, valuable for building, furniture, carts, etc. The winged petioles are most conspicuous in young plants and coppice shoots. Vern. *Tel.* Nemili adaga; *Tam.* Maila; *Kan.* Myrole; *Mal.* Mayilai.

4. VITEX PUBESCENS, Vahl; F. B. I. iv. 585. *V. arborea*, Roxb.; Wt. Ic. t. 1465.

N. Circars, in deciduous forest, common; Deccan and Carnatic to S. Travancore, less so, up to 3,000 ft. in hilly country, often on the banks of streams.

A large tree with 4-angled branchlets and blue or purple flowers. Bark greyish; wood reddish- or olive-brown, very hard, close-grained, durable and useful for building and other purposes. Vern. *Ur.* Dhalasingha; *Tel.* Nowli ₹ragu; *Tam.* Myladi; *Mal.* Atta mayila.

5. VITEX PEDUNCULARIS, Wall.; F. B. I. iv. 587.

N. Circars in deciduous forest, in the hills up to 3,000 ft., usually near streams, fairly common in Ganjam with Sál.

A small or moderate-sized tree, the flowers white with a yellow palate. Bark thick; wood reddish-grey, hard and close-grained.

6. VITEX LEUCOXYLON, Linn. f.; F. B. I. iv. 587. *Wallrothia Leucoxylon*, Roxb.; Wt. Ic. t. 1467.

All Forest Districts at low levels, on the banks of streams.

A deciduous tree with spreading head and white rather large flowers with purple hairs on the long palate, the drupe large and dark purple. Bark grey, smooth; wood light greyish-brown, moderately hard and useful for furniture and carts. Vern. *Tel.* Luki; *Tam.* Nir nocchi; *Kan.* Sengeni; *Mal.* Atta nocchi.

12. Symphorema.

Rambling or climbing shrubs. *Leaves* opposite, entire or toothed. *Flowers* in pedunculate, capitate, usually 7-flowered cymes, with an involucre of 6 oblong or obovate foliaceous bracts accrescent in fruit. *Calyx* obovoid, 4–8-lobed, somewhat accrescent in fruit. *Corolla* with cylindric tube, the limb with 6–16 or more subequal narrowly oblong lobes. *Stamens* as many as the corolla-lobes, exserted; anthers ovate with parallel cells. *Ovary*

2- or imperfectly 4-celled, 4-ovuled, the ovules pendulous. *Fruit* nearly dry, included in the calyx, 1-seeded. *Seed* erect; cotyledons fleshy, concave, enclosing a cavity.

Corolla (tube and lobes) ·25 in. long, lobes 6–8; bracts in flower ·25–·75 in. long, in fruit 1–1·25 in., spathulate, papery, thinly pubescent; leaves ovate or elliptic, subacute, crenate-dentate, stellate-pubescent beneath, up to 6 in. long, 4 in. broad....1. *involucratum.*
Corolla (tubes and lobes) ·5–·75 in. long, lobes 12–16 or more; bracts in flower 1 in. long, in fruit 1·5 in., obovate, soft, tomentose; leaves ovate or suborbicular, acute, crenate-dentate, stellate-tomentose on both surfaces, up to 6 in. long, 4 in. broad .....2. *polyandrum.*

1. SYMPHOREMA INVOLUCRATUM, Roxb. Cor. Pl. t. 186; F. B. I. iv. 599; Wt. Ic. t. 362.
   N. Circars, Deccan and E. slopes of W. Ghâts.
   A deciduous climbing shrub with white flowers.
2. SYMPHOREMA POLYANDRUM, Wt. Ic. t. 363; F. B. I. iv. 599.
   Deccan, Nallamalai Hills of Cuddapah and Kurnool (Beddome, Gamble); Kambakam Hill in Chingleput (Hb. Madr.).
   A climbing shrub with densely fulvous-tomentose branches and young leaves, the flowers white.

13. Sphenodesme, Jack.

Climbing shrubs. *Leaves* opposite, entire, shortly petioled. *Flowers* in capitate 3- or about 7-flowered cymes in an involucre of 6 foliaceous bracts, the cymes in pairs on the branches of large terminal or axillary thyrsoid panicles, leaves at the panicle nodes small and bract-like. *Calyx* ovoid or campanulate, lobes 4–5 short. *Corolla* funnel or salver-shaped, lobes 4–6, oblong or lanceolate. *Stamens* as many as the corolla-lobes, inserted on the corolla-tube, included or exserted; anthers small, ovate or reniform, the cells parallel or divergent. *Ovary* 2-celled, the cells 2-ovuled, the ovules pendulous from an axile placenta; style filiform; stigma 2-lobed. *Fruit* a globose or obovoid drupe, included in the calyx, 1-seeded. *Seed* globose, included in the calyx; cotyledons fleshy.

SPHENODESME PANICULATA, C. B. Clarke; F. B. I. iv. 600.
W. Ghâts, evergreen forests of Cochin and Travancore; Coorg (Rottler); Shevaroy Hills (Perrottet).

A large climber, the branches and inflorescence covered with a golden-brown tomentum, the leaves ovate or elliptic, acute, up to about 5 in. long, 3 in. broad, the main nerves 4–5 pairs. Bracts spathulate, obtuse or emarginate in fruit.

14. Avicennia, Linn

Shrubs or small trees with long creeping roots which give out at intervals narrow conical leafless suckers (pneumatophores) *Leaves* opposite, coriaceous, entire. *Flowers* small, yellow sessile in capitate peduncled heads of close cymes, sometimes forming terminal trichotomous panicles; bracts small. *Calyx* short, 5-partite; lobes ovate, concave, imbricate. *Corolla*-tube short, cylindric; lobes 4, subequal, or the posterior slightly the larger. *Stamens* 4, adnate to the corolla-throat; filaments short; anther-cells ellipsoid, parallel. *Ovary* imperfectly 4-celled, the central axis 4-winged; ovules 4, pendulous between the axial wings; style tapering; stigma bifid. *Fruit* a compressed capsule, dehiscing by 2 leathery valves. *Seed* solitary, erect; albumen 0; cotyledons large, longitudinally plicate; radicle villous; seed often germinating on the plant.

Leaves obtuse at apex, elliptic-oblong or obovate, attenuate at base, glabrous and shining above, minutely and closely brownish-pubescent beneath, up to 4 in. long, 2 in. broad; anthers exserted; style elongate, tapering; capsule ovoid, 1–1·5 in. long .....1. *officinalis.*

Leaves acute at apex; anthers included; style very short, conical:—

Leaves ovate or lanceolate, cuneate at base, glabrous and shining above, minutely and closely tawny-pubescent beneath, up to 3 in. long, 1·5 in. broad; capsule ovoid, about ·75–1 in. long 2. *marina.*

Leaves lanceolate, very acute or acuminate, alternate and decurrent at base, glabrous and shining above, closely whitish-pubescent beneath, up to 4·5 in. long, 1·5 in. broad; capsule when young conical and beaked, when old ovoid, ·75 in. long.....3. *alba.*

1. AVICENNIA OFFICINALIS, Linn.; F. B. I. iv. 604. *A. tomentosa*, Jacq.; Wt. Ic. t. 1481.

W. Coast, in S. Canara, Malabar, Cochin and Travancore, along the coast, in creeks and tidal marshes. E. Coast, in the Godavari Delta (Homfray, Foulkes); White Mangrove.

A small tree. Bark greyish-brown, thin; wood brown or grey, hard, of peculiar structure and used only for fuel when other and better kinds are not available. Vern. *Tel.* Mada; *Tam.* Upattha; *Mal.* Orei.

2. AVICENNIA MARINA, Vierh. in Denkschr. Akad. Wien. lxxi, 435. *Sceura marina*, Forsk. Fl. Æg.-Ar. Cent. i. 37.

E. Coast, from the Kistna southwards, along the coast in tidal waters and salt swamps.

A large shrub, the wood of similar peculiar structure and used for fuel. Vern. *Tel.* Mada; *Tam.* Venkandan.

3. AVICENNIA ALBA, BC.; Wt. Ic. t. 1482. *A. officinalis*, var. *alba*, C. B. Clarke; F. B. I. iv. 604.

E. Coast, delta of the Kistna river (A. W. Lushington, Foulkes). Tummalapenta in Nellore (Fischer).

A shrub, apparently scarce. Vern. *Tel.* Gundu Mada.

Verbena venosa, Gill and Hook., and *V. bonariensis*, Linn., are S. American plants with purple flowers, cultivated sometimes in gardens and sometimes found run wild, especially in Nilgiris. The garden *Verbenas* of various colours are believed to be hybrids of the S. American *V. chamædrifolia*, Jun.

Duranta Plumieri, Jacq., is a pretty blue-flowered shrub of the W. Indies commonly found in gardens in the plains.

Petrea volubilis, Linn., is a beautiful climbing shrub of tropical America with pendulous racemes of violet flowers in a large purplish persistent calyx, commonly grown in gardens.

Congea tomentosa, Roxb., var. *azurea*, is another beautiful climbing shrub of Burma and Siam, conspicuous by its large pink or lilac bracts.

Holmskioldia sanguinea, Retz, is a straggling shrub of N. India with a large scarlet calyx and corolla often found in Madras Gardens.

Family CXV. LABIATAE.

Herbs or undershrubs rarely shrubs, usually with aromatic oil-glands; branches opposite or verticillate, usually 4-angled. *Leaves* opposite or whorled, simple or rarely pinnatisect; stipules 0. *Flowers* hermaphrodite, more or less zygomorphic, solitary or in pairs or fascicled and axillary, or in centrifugal cymes which by union in pairs form false whorls; bracts and bracteoles

usually small. *Calyx* inferior, persistent, more or less tubular, 4–5-lobed, the lobes often forming 2 lips. *Corolla* hypogynous, tubular at base, the limb 4–5-lobed or 2-lipped, the lobes imbricate in bud. *Stamens* inserted in the corolla-tube, 4 didynamous or only 2 perfect; anther-cells connate separate or confluent, dehiscing longitudinally. *Disk* prominent. *Ovary* deeply 4-lobed; ovules solitary anatropous in each lobe; style simple, from the centre of the ovary between the lobes, slender, 2-fid, sometimes unequally. *Fruit* of 4 dry (rarely fleshy) 1-seeded nutlets, sometimes 1 or more suppressed, scarred at the base. *Seed* small, erect; albumen scanty or 0; radicle inferior.

Ovary 4-partite; nutlets with small scar, basilar or slightly oblique :—
Nutlets dry :—
Stamens 4, all perfect and declinate; anther-cells at length confluent :—
Attachment of nutlets basilar :—
Lower lip of corolla declinate, flat or slightly concave, generally narrower, but hardly longer than the 3–4-lobed upper lip :—
Calyx deflexed in fruit; upper lobe widest, large, ovate, recurved, the margins decurrent on the tube :—
Corolla-tube short; lower lip flat; stigma 2-fid **1. Ocimum.**
Corolla-tube usually long, lower lip concave; stigma entire ..... 2. **Orthosiphon.**
Calyx suberect or declinate in fruit; upper lobe widest, the margins not decurrent on the tube :—
Whorls crowded in globose or ovoid heads; calyx suberect ..... 3. **Acrocephalus.**
Whorls racemose or spicate; calyx usually declinate :—
Racemes simple :—
Bracts conspicuous; lower lip of calyx not inflexed **4. Geniosporum**
Bracts small; lower lip of calyx inflexed **5. Platystoma.**
Racemes paniculate ..... 6. **Moschosma.**
Lower lip of corolla deflexed, concave boat-shaped or saccate, much longer than the upper lip :—
Upper lip of corolla very short, obtusely 3–4-toothed, lower lip elongate, boat-shaped :—
Calyx equally 5-toothed or somewhat 2-lipped, the

upper 3-, the lower 2-toothed, or with upper lip large rounded reflexed, the others narrow, subulate :—

Filaments free .....7. **Plectranthus.**

Filaments connate in a sheath at their bases, round the style .....8. **Coleus.**

Calyx very oblique, 2-lipped, the upper lip large entire and nearly or quite closing the mouth, the lower truncate, obscurely 4-toothed; or calyx 1-lipped, 5-toothed, not quite closing the mouth....9. **Anisochilus.**

Corolla obscurely 2-lipped, the 2 upper lobes flat, the lower lip deflexed, saccate; calyx-teeth subequal 10. **Hyptis.**

Attachment of nutlets slightly oblique to the outer side; calyx-lobes subequal; corolla 2-lipped; stamens included in the tube .....11. **Lavandula.**

Stamens erect or spreading or ascending :—

Stamens 4 perfect :—

Corolla-lobes 4; stamens equal or subequal :—

Calyx 5-toothed; stamens exserted :—

Corolla-lobes unequal; whorls in glomerate or paniculate or solitary interrupted spikes; filaments bearded or naked .....12. **Pogostemon.**

Corolla-lobes equal; whorls in slender continuous spikes; filaments bearded.....13. **Dysophylla.**

Calyx 5-partite, the lobes plumose; filaments naked, included.....14. **Colebrookea.**

Corolla lobes 5, 2-lipped; stamens didynamous :—

Anterior pair of stamens the longer :—

Calyx 13-nerved; anthers 2-celled, the cells short :—

Calyx equally 5-toothed .....15. **Micromeria.**

Calyx distinctly 2-lipped.....16. **Calamintha.**

Calyx 5–10-nerved; anthers 2-celled, the cells linear :—

Upper lip of corolla short, nearly flat; stamens exserted, the cells of the upper pair dimidiate, of the lower transverse .....17. **Anisomeles.**

Upper lip of corolla hooded :—

Upper lip of corolla not woolly :—

Calyx 2-lipped with a broad plate or pouch at the back, the mouth closed after flowering 18. **Scutellaria.**

Calyx tubular, upper lip 3-, lower 2-toothed 19. **Brunella.**

Upper lip of corolla densely woolly :—

Calyx 5-toothed, the teeth spinescent ; stamens more or less exserted ; anther-cells parallel **20. Leonurus.**

Calyx 6–10-toothed ; stamens included ; anther-cells divergent :—

Lower lip of corolla longer than the hood **21. Leucas.**

Lower lip of corolla shorter than the hood **22. Leonotis.**

Posterior pair of stamens the longer ; calyx tubular, 15-ribbed, 5-toothed ; stamens not exserted ..... **Nepeta.**

Stamens 2, anterior pair only perfect ; anther-cells linear, separated by an elongated connective or one cell abortive ; calyx 2-lipped :—

Corolla 4-lobed ; anthers 2-celled, the cells pendulous from a long connective ..... **Meriandra.**

Corolla 2-lipped, the upper lip entire or emarginate, concave, the lower spreading, 3-fid ; anther-cells very unequal or solitary, on a long transverse connective ..... **23. Salvia.**

Nutlets succulent ; corolla 2-lipped, the upper lip hooded ; anther-cells parallel, the anterior pair of stamens the longer **24. Gomphostemma.**

Ovary 4-lobed ; nutlets with a large oblique or lateral scar on the inner side ; stamens 4 perfect, erect, exserted from the fissure of the upper lip :—

Corolla apparently 1-lipped, the 2 small upper lobes and the lateral pair springing from the contracted base of the large lower lobe **25. Teucrium.**

Corolla distinctly 2-lipped, the upper lip short, 2-lobed, notched, the lateral pair of lobes very small, springing from the sides of the large lower lobe..... **26. Ajuga.**

1. Ocimum, Linn.

Herbs, undershrubs or shrubs, strongly aromatic from oil-glands. *Leaves* opposite or whorled, usually toothed, petioled ; floral leaves small, bract-like, usually caducous. *Flowers* small, in whorls of 6–10 on the axis of elongate spikes or racemes which are sometimes panicled ; pedicels with recurved tips ; bracts small, caducous. *Calyx* ovoid or campanulate, deflexed in fruit and then usually enlarged and hardened, 2-lipped ;

upper lip broad, flat, decurrent, lower lip with 4 mucronate teeth, the 2 middle ones usually the longest. *Corolla* 2-lipped: tube short, not annulate within; upper lip subequally 4-lobed. lower lip hardly longer than the upper, declinate, entire. *Stamens* 4 didynamous, declinate, exserted; filaments free or the lower connate below, the upper often with a tooth or hairy below; anthers 1-celled, later on flattened out. *Disk* entire or 3-4-lobed. Ovary 4-partite; style slender, bifid at apex. *Fruit* of 4 dry, smooth or subrugose, nutlets, often mucilaginous when wetted.

Shrubs; leaves membranous, ovate, acute, cuneate and decurrent at base, coarsely crenate-serrate, nearly glabrous except on the nerves, long-petioled, up to 4 in. long, 2 in. broad; racemes often 6 in. long, the whorls close and about ·3 in. apart; upper calyx-lip longer than the lower, rounded and curved upwards in fruit, teeth of the lower short; nutlets large, not mucilaginous when wetted . . 1. *gratissimum.*

Herbs or slightly woody undershrubs :—

Racemes elongate, the whorls close; two lower teeth of the calyx longest :—

Fruiting calyx large, hairy or glabrous, the upper lip often ·25 in. in diam. and saucer-shaped; racemes long and closely whorled, or shorter and much panicled, the floral leaves conspicuous till they fall; leaves variable, ovate or lanceolate, acute, cuneate at base, entire or dentate, usually glabrous, up to 3 in. long, 1·5 in. broad, but usually smaller; nutlets large, pitted, very mucilaginous when wetted . . . . . 2. *basilicum.*

Fruiting calyx small, villous and pilose without, the upper lip recurved often to nearly erect, middle teeth of lower lip long and curved :—

Fruiting calyx villous within, the pedicel shorter and erect except at tip; leaves elliptic-lanceolate, entire or slightly serrate, long-petioled, pubescent, up to 1·5 in. long, ·5 in. broad; nutlets small, pitted, mucilaginous when wetted 3. *canum.*

Fruiting calyx glabrous within, the pedicel as long or longer, spreading; leaves elliptic-oblong, obtuse or acute, entire serrate or dentate, pubescent, petioled, up to 2 in. long, 1 in. broad; nutlets small, nearly smooth, not mucilaginous when wetted 4. *sanctum.*

Racemes lax, the whorls distant, often ·5–1 in.; fruiting calyx papery, the upper lip obovate, mucronate, the lower as long, the

two lower teeth long, the side ones very short, bimucronate, all nearly glabrous within and without; leaves ovate, obtuse, entire or repand, cuneate at base, up to 1 in. long, ·75 in. broad; nutlets orbicular, compressed, mucilaginous when wetted....5. *adscendens.*

1. OCIMUM GRATISSIMUM, Linn.; F. B. I. iv. 608.
   Deccan and Carnatic, in low country, cultivated and probably introduced only, chiefly found on waste land and near villages. Shrubby Basil.
   A shrub reaching 4–6 ft. in height, much branched, the flowers pale greenish-yellow, the leaves strongly aromatic and used in medicine. Vern. *Hind.* Ram tulsi; *Tel.* Rama tulasi.
2. OCIMUM BASILICUM, Linn.; F. B. I. iv. 608.
   Carnatic, cultivated. Sweet Basil.
   A large herbaceous plant with large leaves and long close racemes of white or pale purple whorled flowers. Vern. *Hind.* Babui tulsi, Kali tulsi.

Var. *thyrsiflorum*, Benth.; Wt. Ic. t. 868.
   Deccan, probably cultivated only.
   A stout, nearly glabrous, herbaceous plant with the racemes short and collected in terminal thyrsoid panicles, the flowers pink.

Var. *purpurascens*, Benth.
   Carnatic, introduced.
   A slender herb with nearly single racemes, narrow lanceolate leaves and a generally purple colour.

Var. *pilosum*, Benth.
   Deccan and Carnatic, cultivated and run wild.
   A slender hispid-pubescent herb with small leaves and narrower racemes, the fruiting calyces much smaller.

3. OCIMUM CANUM, Sims.; F. B. I. iv. 607.
   Most plains Districts, near villages and on waste lands, probably introduced; also in Nilgiris. Hoary Basil.
   An erect much-branched herb, with white, pink or purplish flowers, used in medicine. Vern. *Tel.* Kukka tulasi.
4. OCIMUM SANCTUM, Linn.; F. B. I. iv. 609.
   All plains Districts, cultivated in pots or on pedestals at all Hindu houses and in temples and frequently found run wild. Sacred Basil.

An erect much-branched softly pubescent undershrub with red or purple small flowers. As the most sacred of plants to Hindus it is carefully looked after, and when large enough to form wood, it is made into beads for rosaries. It is also used medicinally. Vern. *Hind.* Tulsi; *Tam., Tel.* Tulasi.

5. OCIMUM ADSCENDENS, Willd.; F. B. I. iv. 609.

N. Circars, Deccan and Carnatic from the Godavari to Tinnevelly and S. Travancore, in sandy places and up to 3000 ft. in hilly country.

An annual (?) herb, erect or prostrate with ascending branches, the flowers pale rose, the fruiting calyx yellow and papery.

2. Orthosiphon, Benth.

Shrubs, undershrubs or herbs with a woody rootstock, the roots sometimes tuberous. *Leaves* opposite, floral leaves bract-like, usually short and reflexed, sometimes large and coloured. *Flowers* usually in whorls of 6 or less, in terminal racemes. *Calyx* ovoid campanulate or tubular, deflexed in fruit, 5-lobed, the upper lobe broad, membranous, with decurrent margins, the lateral and lower lobes distinct or shortly connate, subulate or aristate. *Corolla* 2-lipped; tube as long as or longer than the calyx, sometimes very long, often slender, straight or incurved; upper lip subequally 4-lobed, lower declinate, entire, concave. *Stamens* 4, didynamous, declinate; filaments free, without appendages at the base; anther-cells confluent. *Disk* usually gibbous. *Ovary* 4-partite; style slender, with a capitate or clavate stigma. *Fruit* of 4 dry ovoid globose or ellipsoid nutlets, usually smooth, the basal scar small.

Stamens included in the corolla-tube :—

Calyx-throat villous within; corolla-tube rather longer than the calyx; leaves ovate or elliptic, obtuse, rounded or cuneate at base, crenate, viscidly tomentose on both surfaces, up to ·75 in. long, petiole to ·5 in. ..... 1. *diffusus.*

Calyx-throat not villous within :—

Corolla-tube about equal to the calyx; leaves ovate, obtuse or acute, cuneate and entire at base, crenate or serrate above, nearly glabrous, glandular, up to 1·5 in. long, 1 in. broad, petiole to ·5 in. ..... 2. *pallidus.*

Corolla-tube longer than the calyx, in all ·25–·75 in. long :—

Leaf-petioles up to 2·5 in. long, leaves broadly ovate, acute obtuse or subcordate or often shortly cuneate at base, coarsely crenate or serrate, nearly glabrous, up to 3·5 in. long, 2 in. broad; corolla ·25–·5 in. long, slender, pubescent without 3. *glabratus.*

Leaf-petioles only up to ·75 in. long, leaves ovate, subobtuse, rounded or cordate at base, crenate, viscous-pubescent and glandular-punctate, up to 3 in. long, 2 in. broad; corolla ·5–·7 in. long, puberulous without ..... 4. *viscosus.*

Lower leaves petioled, upper sessile, ovate-oblong, obtuse, long-cuneate at base, nearly glabrous and sometimes glaucous, coarsely serrate-dentate, up to 4·5 in. long, 2 in. broad; corolla ·3–·5 in. long ..... 5. *rubicundus.*

Stamens exserted from the long and slender corolla-tube :—

Stamens shorter than the spreading corolla-lobes; corolla-tube 1·25 in. long, villous; fruiting calyx ·5 in. long, tubular, hispid and glandular, the upper lip orbicular, the 4 lower teeth subulate, equal; leaves sessile, oblong or obovate, obtuse, crenulate, up to 2·5 in. long, 1 in. broad, rugose and tomentose, strongly nerved 6. *comosus.*

Stamens much longer than the corolla-lobes; corolla-tube ·5 in. long puberulous; fruiting calyx ·3 in. long, campanulate, the upper lip spreading, the 4 lower teeth aristate, the 2 lowest longest and curved; leaves petioled, ovate, acuminate, cuneate at base, coarsely toothed, up to 4 in. long, 2 in. broad, glabrous except on the nerves 7. *stamineus.*

1. ORTHOSIPHON DIFFUSUS, Benth.; F. B. I. iv. 613.

Deccan, hilly country of N. Arcot and Cuddapah, up to 3,000 ft., most usually in rocky places; W. Ghâts, N. and E. slopes of Nilgiris and Pulneys in similar localities.

A diffuse undershrub with many branches from a stout woody rootstock, short and with short racemes in very dry places, longer and with more slender racemes and larger leaves (var. *hispidus*, Hook. f.) in better soils.

2. ORTHOSIPHON PALLIDUS, Royle; F. B. I. iv. 613.

N. Circars, in Godavari and Kistna; Carnatic, about Madras, in wet places near streams and in rice-fields; Nilgiris to 4,000 ft. (Clarke).

A low diffuse undershrub with many branches from a woody rootstock, the flowers white or pale lilac.

3. ORTHOSIPHON GLABRATUS, Benth. *O. tomentosus.* var. *glabratus,* Hook. f.; F. B. I. iv. 614.

N. Circars, in Godavari; W. Deccan, in Mysore, Bellary and Salem; hills of the Carnatic and E. slopes of the Ghâts to S. Travancore, up to 3,000 ft., chiefly in dry open forests.

An erect herb, reaching about 2 ft. in height, with pale purple flowers of medium size.

Var. *parviflorus,* Benth. Corolla small and narrow, ·25 in. long; leaves ovate, coarsely serrate, under 1 in. long, petioles slender, ·75 in.

W. Ghâts, Nilgiris to hills of Tinnevelly, scarce.

4. ORTHOSIPHON VISCOSUS, Benth. *O. tomentosus* var. *viscosus,* Hook. f.; F. B. I. iv. 614.

Deccan, Nagar Hills of N. Arcot; W. Ghâts, in all Districts at low levels, in forest glades.

An erect glandular pubescent herb with, apparently, pale purple flowers, the corolla usually large. Var. *rubiginosus* seems to differ only by being less pubescent and having rather longer petioles to the leaves.

5. ORTHOSIPHON RUBICUNDUS, Benth.; F. B. I. iv. 614.

N. Circars, Ganjam to Godavari, in deciduous forest undergrowth, but in somewhat open places; Deccan, in the hills of the Ceded Districts, westwards to Coimbatore; W. Ghâts, N. and E. slopes of the Nilgiris up to 6,000 ft.

An erect much branching herb from a stout rootstock, the root often furnished with fusiform root-tubers. The flowers may be white lilac or rose, and the racemes 6 in. long or more, usually with distant whorls of flowers.

Var. *Hohenackeri,* Hook. f. A smaller plant with many branches from a stout rootstock and with smaller leaves and flowers, the calyx-tube very hispid.

Nilgiri Hills, at about 6,000 ft. (Hohenacker, Gamble).

6. ORTHOSIPHON COMOSUS, Wt. ex Benth.; F. B. I. iv. 615. *O. bracteatus,* Wt. Ic. t. 1428.

W. Ghâts, hills of Tinnevelly and Travancore, about 2,000–3,000 ft.

A striking and handsome shrubby plant conspicuous for the comose tuft of mauve-coloured floral leaves at the ends of the racemes. The upper lip of the corolla has 2 end

and 2 side lobes, the lower is oblong. The ellipsoid nutlets are smooth and shining.

7. ORTHOSIPHON STAMINEUS, Benth.; F. B. I. iv. 615.

W. Ghâts, Anamalai Hills, at 2,000–3,000 ft.

An erect herb with white or lilac flowers, conspicuous for the very long filiform stamens. The broad upper lip of the corolla is 4-lobed, the lower lip linear-oblong, entire; the floral leaves are small and persistent. The nutlets are ellipsoid, marked with labyrinthiform wavy lines.

3. Acrocephalus, Benth.

Herbs. *Leaves* small, opposite or whorled, petioled. *Flowers* very small, in dense whorls collected in terminal or axillary, globose or ovoid, heads with a pair of floral leaves and imbricate bracts. *Calyx* in flower ovoid, in fruit tubular, gibbous at base, 2-lipped, the upper lip flat, entire, the lower entire emarginate or 4-toothed, throat naked. *Corolla* small, somewhat 2-lipped, the upper lip subequally 4-lobed, the lower entire, scarcely longer. *Stamens* 4, didynamous, declinate; filaments free, filiform, not appendiculate at base; anthers 1-celled. *Disk* small. *Ovary* 4-partite; styles slender, shortly bifid at apex. *Fruit* of 4 smooth dry nutlets.

ACROCEPHALUS INDICUS, Briq. *A. capitatus*, Benth.; F. B. I. iv. 611.

N. Circars, forests from Ganjam to Godavari, in damp places; W. Ghâts and W. Coast in damp grassy places up to 3,000 ft.

An annual erect herb, sometimes quite small, but in places reaching 2 ft. in height, the flowers pale purple, the leaves ovate or lanceolate, acute, cuneate at base to the petiole, serrate, up to 1·5 in. long, ·5 in. broad, the heads ·25–·75 in. long.

4. Geniosporum, Wall.

Herbs, erect or procumbent. *Leaves* opposite or whorled, toothed, floral leaves bract-like, often coloured. *Flowers* small, many, in whorls in long terminal lax or stiff spikes or racemes; bracts small, caducous. *Calyx* in flower ovoid, in fruit tubular, the tube constricted above, 10-nerved and often with transverse

bars; lobes 5, subbilabiate, the uppermost larger, not decurrent. *Corolla* small, 2-lipped; tube short; upper lip 4-lobed; lower lip entire, declinate. *Stamens* 4, didynamous, declinate; filaments free, often flattened, not appendiculate; anthers 1-celled, later flattened out. *Disk* swollen, gibbous. *Ovary* 4-partite; style slender, bifid at apex, the lobes usually flattened. *Fruit* of 4 dry, ovoid or oblong, smooth or slightly punctate nutlets, not or very slightly mucilaginous when wetted.

Prostrate herbs with many branches from a woody rootstock, glabrous or hispid with soft deflexed hairs; racemes slender, up to 6 in. long with many pedicelled flowers in whorls usually closely packed; fruiting calyx with the uppermost lobe ovate-reniform, mucronate, the rest triangular, the 2 lowest slightly longer, tube ·075 in. with a ring of hairs within; floral leaves broadly ovate acuminate, reflexed; leaves ovate or oblong or linear, spathulate, up to 1 in. long, serrate ..... 1. *prostratum.*

Erect herbs, usually unbranched, slightly hispid-pubescent; racemes almost spicate, up to 5 in. long, the whorls closely packed; fruiting calyx ovate, the uppermost lobe large, erect and broadly rounded, the side lobes triangular, the 2 lowest longer and narrow, tube prominently 10-nerved with transverse base, hispid; floral leaves large, reflexed, white and persistent; leaves linear-oblong, up to 2 in. long, scarcely ·25 in. broad, distantly serrate ..... 2. *indicum.*

1. GENIOSPORUM PROSTRATUM, Benth.; F. B. I. iv. 610.

Carnatic, on sandy ground, especially near the sea, common near Madras.

A many-branched herb very variable in pubescence, also in the shape of the leaves, which, in the prostrate more glabrous forms are small and ovate, in the more erect and hispid ones (*ocimoides*) elongate, up to 1 in. long, ·4 in. broad. Flowers red.

Var. *gracile*, Thw. Nearly quite glabrous, the racemes panicled, the leaves very narrow ·1 in. broad and up to 1·5 in. long, the side calyx-lobes broader, ovate like the upper one, the 2 lowest small. Coast of the Carnatic.

2. GENIOSPORUM INDICUM, Briq. *G. elongatum*, Benth.; F. B. I. iv. 610.

N. Circars, Jeypore Hills of Vizagapatam (Beddome).

A very slender plant, chiefly found in Ceylon.

5. Platystoma, Beauv.

Small annual **herbs**. *Leaves* opposite, petioled, serrate. *Flowers* minute, **in many-flowered** whorls in slender racemes terminal to the **stem and branches** with a pair of floral leaves at the base; bracts **broad, caducous**. *Calyx* campanulate, deflexed in fruit, 2-lipped, **the upper lip** ovate, not decurrent, with a tooth at each side **near the base**; lower lip ovate, obtuse, slightly concave. *Corolla*-**tube very short**, widely campanulate at the mouth; upper **lip broad, 4**-lobed, lower entire, scarcely longer. *Stamens* 4 **declinate**; **filaments free**; anthers 1-celled, at length flattened. *Disk* **swollen, gibbous**. *Ovary* 4-partite; style shortly bifid at apex. ***Fruit* of 4** ovoid, smooth nutlets.

PLATYSTOMA FLACCIDUM, Benth.; F. B. I. iv. 611.

Mysore, at Sagar, 2,000 ft. (Meebold).

An erect herb up to 12 in. high with pale lilac flowers, the leaves ovate, acute, narrowed at base into the petiole, serrate, up to 1·5 in. long, ·75 in. broad, nearly glabrous.

6. Moschosma, Reichb.

Herbs. *Leaves* **opposite**, crenate or dentate, petioled. *Flowers* very small, in whorls **of 6–10**, pedicelled, in slender axillary and terminal racemes; **bracts small**. *Calyx* ovoid or campanulate, 2-lipped, the upper **lobe** or 3 upper lobes larger than the 4 or 2 lower, not **decurrent, throat** naked. *Corolla* 2-lipped, the upper lip 4-lobed, **the lobes** subequal or the 2 middle ones rather longer, the lower entire, longer than the upper. *Stamens* 4, didynamous, **declinate**; filaments filiform, not appendiculate; anther-cells **confluent**. *Disk* uniform. *Ovary* 4-partite; style 2-fid at tip. ***Fruit* of 4** compressed smooth nutlets; basal scar small.

MOSCHOSMA POLYSTACHYUM. Benth.; F. B. I. iv. 612.

Carnatic, from **Nellore** southwards to S. Travancore, common, more scarce inland.

A slender erect annual herb with sharply quadrangular **stems, pale pink or flesh-coloured** very small flowers, **ovate deltoid acuminate** leaves, entire at the truncate **base, crenate above, and very slender** racemes about 2 in. long.

7. Plectranthus, L'Hér.

Herbs, undershrubs or shrubs, the stems usually more or less 4-angled, sometimes succulent. *Leaves* opposite or ternate. *Flowers* usually small, in panicled or racemed 6–8-flowered cymes or whorls, with pairs of floral leaves; bracts usually small but sometimes large and caducous. *Calyx* usually 2-lipped, enlarged in fruit; lobes 5, subequal or the uppermost widest and sometimes decurrent. *Corolla* 2-lipped; tube exserted, straight or decurved, the throat equal or obliquely swollen, the upper lip short, 4-fid, recurved, the lower entire, boat-shaped, narrow or stipitate at the base. *Stamens* 4, didynamous, declinate; filaments free; anther-cells usually confluent. *Disk* usually enlarged in front. *Ovary* 4-partite; style slender, 2-fid at tip. *Fruit* of 4 orbicular ovoid or oblong nutlets, smooth or punctate.

Fruiting calyx decurved, more or less 2-lipped, the upper lip 3-, the lower 2-lobed, sometimes subequally 5-lobed; slender herbs, never succulent :—

Lips of the fruiting calyx prominent, ribs also prominent :—

Leaves narrowly linear-lanceolate, shallowly serrate in the upper half only, the lower half entire and attenuate to a short petiole, up to 3 in. long, ·4 in. broad, nearly or quite glabrous; corolla short, ·15 in. long, the lobes short ..... 1. *Walkeri.*

Leaves lanceolate, acute, strongly crenate in the upper two-thirds, the lower part entire, cuneate, the petiole long and slender, blade 2·5 in. long, nearly 1 in. wide, nearly glabrous; corolla short, ·15 in. long ..... 2. *rivularis.*

Leaves ovate, acute, crenate-serrate almost to the base, glandular-pubescent, up to 1·75 in. long, 1 in. broad, petiole short; corolla-tube funnel-shaped, ·2 in. long, the lower lip ·1 in.; fruiting calyx ·2 in. with scattered glands ..... 3. *nigrescens.*

Lips of the fruiting calyx not prominent, ribs prominent, with glands between :—

Fruiting calyx slightly curved, minutely scabrous, the teeth usually acute, ·2 in. long; corolla-tube campanulate, the lower lip long, concave; leaves broadly ovate, acute, cordate or rounded at base, crenate or dentate, pubescent or glabrate, up to 5 in. long, 3 in. broad, petioled ..... 4. *Wightii.*

Fruiting calyx much curved, slightly scabrous, the teeth rounded, ·15 in. long; corolla-tube straight, lower lip short; leaves ovate, obtuse, truncate and then slightly cuneate at base, deeply crenate-

dentate, membranous and nearly glabrous, up to 1·5 in. long and broad, petioled .....5. ***Stocksii.***

Fruiting calyx gibbose at base and slightly curved, densely woolly, the short teeth rounded, ·15 in. long; corolla-tube cylindric, lobes hispid-ciliate, short and spreading; leaves broadly ovate, acute, cordate at base, crenate, thick, rugose and densely tawny-pubescent or tomentose, up to 5 in. long, 3 in. broad, the lower ones petioled, the upper sessile .....6. ***nilgherricus.***

Fruiting calyx subequally 5-lobed, small and curved, declinate; corolla-tube short, curved, upper lip reflexed, 4-lobed, lower entire, concave; leaves ovate, acute, obtuse at base but shortly cuneate and decurrent, crenate, tomentose, white beneath, up to 4 in. long, 2 in. broad .....7. ***Coetsa.***

Fruiting calyx 2-lipped, the upper lip entire, the lower 4-lobed; stout plants, often succulent or fleshy:—

Fruiting calyx nearly ·5 in. long, the lower lip longer than the small round upper, the teeth incurved and aristate; corolla ·3 in. long, the lower lip obtuse; leaves broadly ovate, cordate, deeply and usually doubly crenate, pale, nearly glabrous above, puberulous beneath and villous on the nerves, up to about 6 in. in diam.

8. ***incanus.***

Fruiting calyx about ·25 in. long, the upper and lower lips nearly equal:—

Inflorescence of elongate panicles of racemes with whorls of about 6 flowers on slender pedicels; corolla very small, about ·15 in. long, villous, the lower lip obtuse; leaves broadly ovate or orbicular, cordate, lobulate, the lobules crenate, about 4 in. in diam., flaccid and glabrous; petiole very long ....9. ***subincisus.***

Inflorescence panicled, of racemes about 1 in. or more long in elongate thyrsi:—

Corolla ·5 in. long, the lower lip elongate, acute, ciliate; leaves broadly ovate or orbicular-ovate, acute, cordate, glandular-pubescent, crenate, up to 4 in. in diam., fleshy; petiole long

10. ***coleoides.***

Corolla ·3–·5 in. long, the lower lip acute, glabrous; leaves large, broadly ovate, acuminate, rounded at base, deeply lobulate, the lobules crenate, glabrous, up to 6 in. in diam., petiole very thick, 2–3 in. long .....11. ***urticifolius.***

Fruiting calyx under ·2 in. long; inflorescence panicled, of racemes about 1 in. long or more in elongate thyrsi; more or less fleshy undershrubs:—

Leaves large, broadly ovate, obtuse, cordate or rounded at base,

villous on the nerves above, densely tawny tomentose beneath, margins lobulate, the lobules often crenate, up to 10 in. in diam., petioles long; fruiting calyx thick and glandular; corolla elongate, ·75 in., the lower lip acute; flowers close, in racemes 1–2 in. long ..... 12. *fruticosus.*

Leaves rather small, not over 3 in. long, petioled :—

Leaves orbicular, 1–1·5 in. in diam., obtuse, base slightly cuneate and not toothed, upper part crenate, tawny-pubescent; thyrsoid panicles up to 10 in. long, the racemes 1–1·5 in. long, the flowers close; fruiting calyx nearly ·2 in. long, tawny villous; corolla ·5–·75 in., the lower lip acute ....13. *Bourneae.*

Leaves ovate, up to 3 in. long, 2 in. broad, acute, base rounded or slightly cuneate, not toothed, upper part crenate, minutely puberulous; thyrsoid panicles up to 10 in. long, the racemes very slender, single or in pairs on a peduncle, up to 3 in. long, the flowers distant; fruiting calyx scarcely ·125 in. long, villous at base; corolla ·6 in. long, the lower lip subobtuse 14. *Bishopianus.*

1. PLECTRANTHUS WALKERI, Arn.; F. B. I. iv. 617.
   W. Ghâts, hills of Tinnevelly at 4,000 ft., on the banks of streams.
   A herb, decumbent at base, then erect, the flowers pink (Trimen), the narrow leaves very characteristic.
2. PLECTRANTHUS RIVULARIS, Wt.; F. B. I. iv. 617.
   W. Ghâts, Nilgiris and Anamalais, about 6,000 ft., in wet places; Atraimalai Hills. 3,000–4,000 ft. (Beddome).
   A tall herb, with long racemes of many-flowered short cymes in distant whorls.
3. PLECTRANTHUS NIGRESCENS, Benth.; F. B. I. iv. 617.
   W. Ghâts, hills of Mysore (Talbot, Meebold); Shembaganur in Pulneys at 6,000 ft. (L. Anglade).
   A slender herb with many-branched slender panicles of white flowers spotted with red, long-pedicelled in dichasioid cymes.
4. PLECTRANTHUS WIGHTII, Benth.; F. B. I. iv. 619; Wt. Ill. t. 194; Wt. Ic. t. 1429. *P. pulneyensis*, Hook. f.; F. B. I. iv. 617. *P. nepetaefolius*, Benth.; F. B. I. iv. 619.
   W. Ghâts, Nilgiris, Anamalais and Pulneys up to 8,000 ft. and chiefly at higher levels, common; Shevaroy Hills of Salem.

A tall herb with white flowers speckled with red points and large panicles of prominently small-bracted cymes. The leaves are normally cordate at base, but many Pulney specimens (chiefly *P. pulneyensis*, Hook. f.) have them straight or slightly cuneate. Fyson ('Hillt. Flora,' i. 322) seems to be right in considering the three as one variable species. In the form *nepetaefolius* the corollas are usually longer and narrower and the panicles more slender.

5. PLECTRANTHUS STOCKSII, Hook. f.; F. B. I. iv. 618.

Bababudan Hills of Mysore, at 6,000 ft. (Heyne, *fide* 'F. B. I.,' Meebold).

A slender annual, decumbent and rooting at base, the stems thin, erect, the corollas white with purple spots.

6. PLECTRANTHUS NILGHERRICUS, Benth.; F. B. I. iv. 619.

W. Ghâts, Nilgiris, from Wynaad upwards, 4,000–7,000 ft.

A tall herb, reaching 3 ft. high or more from a large root-stock, the whole plant tawny villous and the large panicles very (especially the calyces) yellowish woolly. The corollas are apparently white with red spots and the whole plant is usually covered with red glands.

7. PLECTRANTHUS COETSA, Buch.-Ham. *ex* D. Don; F. B. I. iv. 619. *P. menthoides*, Benth.; F. B. I. iv. 620.

W. Ghâts, Nilgiris and Pulneys, at 5,000–8,000 ft., edges of Shola Forest; N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft. (Gamble).

A tall herb with more or less tomentose leaves white beneath and lavender-blue flowers.

Var. *Macraei*, Hook. f. in Herb. Kew. *P. Macraei*, Benth.; Wt. Ic. t. 1430. Leaves rounded at base, smaller, especially on the branches, softly tomentose, cymes denser and more closely-flowered, but in many cases running into the type.

W. Ghâts, Nilgiris and Pulneys, at 5,000–8,000 ft., in moist places and on the banks of ditches (Wight).

8. PLECTRANTHUS INCANUS, Link; F. B. I. iv. 621.

Deccan, Carnatic and W. Ghâts, in hilly country, at about 3,000–6,000 ft.

An erect herb, reaching 2·5 ft. high with pale leaves and fleshy stem and branches, the racemes up to 9 in. long, the flowers pale lilac or light blue, the nutlets spotted.

9. PLECTRANTHUS SUBINCISUS, Benth.; F. B. I. iv. 621.
Hills of Tinnevelly and Travancore, scarce.
A small erect flaccid herb, the racemes reaching 10 in. long, the nutlets pitted.

10. PLECTRANTHUS COLEOIDES, Benth.; F. B. I. iv. 622. *Coleus Wightii*, Benth.; Wt. Ic. t. 1433.
W. Ghâts, Nilgiris, Anamalais and hills of Travancore, at 4,000–7,000 ft., in wet places.
A succulent herbaceous plant reaching 3 ft. in height, the stems purple, the panicles reaching 12 in. long and up to 8 in. in diam., the flowers lilac, the nutlets black and shining. When young the upper parts of the racemes have conspicuous large rounded bracts which are very early deciduous.

11. PLECTRANTHUS URTICIFOLIUS, Hook. f.; F. B. I. iv. 622.
W. Ghâts, hills of Tinnevelly, at about 4,500 ft.
A succulent herb with short stem and large panicles, the flowers apparently purple, the nutlets brown and shining.

12. PLECTRANTHUS FRUTICOSUS, Hook. f.; F. B. I. iv. 623.
W. Ghâts. Nilgiri and Pulney Hills, about 7,000 ft., banks of lakes and streams.
A large succulent undershrub with thick spongy stem, the flowers mauve, the inflorescence often 12 in. long and very dense. Lady Bourne says that it is planted for hedges in the Pulneys.

13. PLECTRANTHUS BOURNEAE, Gamble in Kew Bull., 1924, ined.
W. Ghâts, Pulney Hills, about 6,000–7,000 ft., near Kodaikanal, along streams, especially in rocky places (Bourne); Coonoor, in Nilgiris 6,500 ft. (Gamble).
A large succulent undershrub with thick stem, the flowers lilac, the leaves whitish or tawny tomentose.

14. PLECTRANTHUS BISHOPIANUS, Gamble in Kew Bull, 1924, ined.
W. Ghâts. Pulney Hills, near Pillar Rocks, Kodaikanal, about 7,000 ft. (Bourne), drawing in Hb. Kew by Mrs. Bishop.
A large erect slightly fleshy undershrub with lilac flowers, the lower leaves often rather large and more rounded and purplish, the branches of the inflorescence very slender.

8. Coleus, Lour.

Herbs or undershrubs, usually aromatic, often fleshy. *Leaves* opposite. *Flowers* in close or lax paniculate or racemose cymes, with pairs of very caducous floral leaves; bracts also very caducous. *Calyx* 2-lipped, the tube usually decurved, the throat often oblique; upper lip broad, the lower of 4 usually acuminate lobes. *Corolla* 2-lipped; tube exserted, decurved; upper lip short and slightly 4-lobed, recurved; lower lip long, entire, boat-shaped, narrow or stipitate at base. *Stamens* 4, didynamous, connate below in a sheath around the style; anther-cells confluent. *Disk* enlarged in front. *Ovary* 4-partite; style slender, 2-fid at tip. *Fruit* of 4 orbicular or ovoid nutlets, smooth, the basal scar small.

Calyx-throat villous with a ring of white hairs :—

Fruiting calyx with upper lip broad, very obtuse, shorter than the lower; floral leaves ovate, acute; whorls of flowers densely packed; leaves subsessile, glabrous, very fleshy, obovate, obtuse, entire or crenate, up to 2 in. long, 1 in. broad; nutlets black....1. *spicatus.*

Fruiting calyx with upper lip ovate acuminate, a little longer than the lower; floral leaves broadly ovate, long acuminate; whorls of flowers close at first afterwards up to 1 in. distant; leaves petioled, villous, not fleshy, ovate, obtuse, crenate, up to 5 in. long, 1·5 in. broad; nutlets brown.....2. *barbatus.*

Calyx-throat glabrous within :—

Flowers shortly pedicelled, in dense whorls at distant intervals in a long rather slender raceme; leaves petioled, thick and fleshy, very villous, broadly ovate, crenate, up to 3 in. long, 2 in. broad; calyx hispid, small, the upper lip ovate acute, the lower of 4 acuminate lobes.....3. *amboinicus.*

Flowers in short cymes in pairs or whorls at distant intervals in long racemes often paniculate; leaves long-petioled, membranous, glabrous, ovate, acute, cordate rounded or slightly acute at base, up to 7 in. long, 5 in. broad; calyx glabrous, fruiting large, the upper lip rounded and reflexed, the lower of 4 acuminate sharp lobes 4. *malabaricus.*

1. **Coleus spicatus**, Benth.; F. B. I. iv. 624; Wt. Ic. t. 1431.

Deccan, especially in Salem and Coimbatore, in arid places on rocky ground among bushes.

A perennial fleshy herb with subquadrangular softly hairy

stems ascending from a procumbent base and with a strong scent. Flowers pale lilac.

2. COLEUS BARBATUS, Benth.; F. B. I. iv. 625; Wt. Ic. t. 1432.

   Deccan and Carnatic, in hilly country; W. Ghâts, Nilgiris and Pulneys up to 7,000 ft.; often cultivated in gardens.

   A perennial aromatic herb with branches from a thick rootstock, very softly-generally white-hairy, the flowers blue.

3. COLEUS AMBOINICUS, Lour. *C. aromaticus*, Benth.; F. B. I. iv. 625; Wt. Ill. t. 175.

   Circars, Deccan and Carnatic, a Malay species cultivated and found run wild.

   A rather large succulent very aromatic herb with small pale purple flowers, said to be known as Indian Borage and used for flavouring drinks and in medicine. Vern. *Hind.* Pathor chur.

4. COLEUS MALABARICUS, Benth.; F. B. I. iv. 626.

   W. Ghâts, Nilgiris, Pulneys and hills of Travancore and Tinnevelly up to 6,000 ft.

   A large erect herbaceous plant reaching 3 ft., with often purple stems and leaves, the flowers pale lilac with dark blue upper lip.

Coleus parviflorus, Benth., F. B. I. iv. 625, is a species sometimes cultivated in Southern Districts for its edible tubers. *C. Blumei*, Benth., is a beautiful species with the leaves mottled with deep purple or sanguineous stains (see 'Bot. Mag.,' t. 4754), which is commonly cultivated in gardens.

9. Anisochilus, Wall.

Herbs or undershrubs, often fleshy. *Leaves* opposite or whorled. *Flowers* small, in dense tetragonal or cylindrical or slender whorled spikes, the floral leaves and bracts often caducous, red glands often covering especially the corollas. *Calyx* suberect, inflated below the middle, 2-lipped or 5-lobed, rarely 1-lipped, the upper lip often entire and much deflexed, the lower short, truncate or minutely lobed. *Corolla* 2-lipped, the tube slender below, inflated above and decurved; upper lip entire or 3–4-lobed, lower elongate, concave. *Stamens* 4, didynamous,

declinate, filaments free. *Disk* lobed. *Ovary* 4-partite; style bifid at apex. *Fruit* of 4 ovoid dry nutlets, basal scar small.

Upper lip of fruiting calyx entire, deflexed, concealing the mouth, lower lip truncate obscurely toothed :—

Upper lip large and conspicuous in the spikes ; spikes ·5 in. in diam., usually 1–2 in. long in fruit :—

Upper lip ovate, acute at apex, ·1 in. long, tube swollen and curved, ·2 in. long :—

Calyx-tube pubescent without, not silky-villous at the mouth; leaves broadly ovate, obtuse, cordate or rounded at base, deeply crenate, glabrous or villous above, puberulous beneath, up to 3·5 in. long, 2 in. broad, petiole up to 2 in. long 1. *carnosus.*

Calyx-tube densely white silky-villous at the mouth, glabrous towards the base ; leaves thick, orbicular-ovate, obtuse, cordate, shallowly crenate, glandular puberulous, up to 2 in. long, 1·5 in. broad, but usually smaller, petiole under 1 in. long 2. *eriocephalus.*

Upper lip obtuse and broad glabrous, prominently reticulate, ciliate, tube not much curved, very villous, ·2 in. long ; leaves thick, ovate, obtuse rounded or attenuate at base, crenulate, densely softly hoary tomentose, up to nearly 2 in. long, 1 in. broad, petiole ·5—·75 in. long.....3. *scaber.*

Upper lip small and inconspicuous in the spike ; spikes ·25—·5 in. in diam. :—

Upper lip obtuse, ciliate ; spikes short, in many-branched trichotomous panicles ; leaves thick, ovate or orbicular, obtuse, cordate or rounded at base, crenulate, hoary-tomentose, up to 2·5 in. long, 1·5 in. broad, ; petiole ·5 in. long....4. *paniculatus.*

Upper lip acute, white-puberulous ; spikes long and narrow, 3–6 only in a very long-peduncled panicle ; leaves ovate, obtuse, cuneate at base, crenate, hoary-tomentose, up to 2 in. long, 1·5 in. broad, petiole short.....5. *Wightii.*

Upper lip of fruiting calyx short, entire or notched, not concealing the mouth, lower lip truncate :—

Spikes solitary, terminal on the branches :—

Spikes shortly peduncled (1–1·5 in.), very slender, ·1—·15 in. in diam., 2–3 in. long ; leaves obovate, obtuse, sessile, slightly crenate, ·75 in. long, with 3–4 pairs of very oblique impressed main nerves, collected close under the spikes ; corollas much curved .....6. *plantagineus.*

Spikes long-peduncled in fruit :—

Spikes 2–4 in. long, ·3–·4 in. in diam., cylindrical, densely white villous on the bracts and calyces; leaves opposite or whorled, sessile, oblanceolate, acute, entire, almost parallel-nerved, densely silvery- or tawny-tomentose, up to ·75 in. long, ·25 in. broad; corollas very small, short..... 7. *argenteus.*

Spikes 3–9 in. long, up to ·5 in. in diam., cylindrical, with inconspicuous lanceolate bracts; leaves in whorls, sessile, oblong lanceolate or oblanceolate, acute, entire or crenulate, with 5–6 pairs of oblique main nerves, silky-villous, up to 3 in. long, ·5 in. broad; corolla large, the tube much enlarged above, the lips spreading .....8. *verticillatus.*

Spikes short-peduncled, terminal and axillary on the branches of a leafy panicle :—

Spikes 1–3 in. long, ·2–·3 in. in diam., cylindrical, the bracts inconspicuous; leaves subsessile, opposite, obovate, obtuse, entire or obscurely crenate, fulvous-tomentose, with 3–4 pairs of very oblique main nerves, up to 2 in. long, ·5 in. broad; corolla very minute, the lips spreading.....9. *dysophylloides.*

Spikes 1–3 in. long, ·1–·2 in. in diam., slender, the bracts imbricating; leaves sessile, whorled, oblong or obovate, entire or slightly crenate, densely white- or fulvous-silky tomentose, with 3–4 pairs of nearly parallel main nerves, up to 2 in. long, ·6 in. broad; corolla very minute, the upper lip incurved .....10. *sericeus.*

Spikes in terminal long-peduncled racemes on stout branches covered with broad scars; leaves short-petioled, ovate-lanceolate, subacute, entire, tomentose, prominently closely nerved beneath, 1–1·5 in. long, ·5 in. broad; corolla-tube long and much deflexed 10. *suffruticosus.*

Upper lip of fruiting calyx erect or recurved or deflexed, entire or emarginate, not quite concealing the mouth, lower reflexed, bifid, tube ventricose, very red-glandular; spikes very long and slender in terminal panicles, the flowers in whorls; corolla-tube bent in the middle and broad above, the upper lip incurved, the lower deflexed; leaves petioled, very large, ovate, acute, rounded at base, crenulate, but lower ones sometimes deeply crenate, 12–15-nerved, tomentose beneath, up to 15 in. long, 8 in. broad.....12. *robustus.*

1. ANISOCHILUS CARNOSUS, Wall.; F. B. I. iv. 627.

N. Circars, Deccan and Carnatic, in rocky places on the hills, up to 3,000 ft. or more, less common on W. Coast.

An erect herb with tetragonous stems, and flowers in long-

peduncled spikes, small in flower but large and strobilate in fruit, and covered with red glands. Corolla pale purple. nutlets orbicular, compressed, shining, brown.

2. ANISOCHILUS ERIOCEPHALUS, Benth.; F. B. I. iv. 627.
Deccan, in Cuddapah, N. Arcot and Chittoor, up to 4,000 ft. on Horsleykonda (Gamble), Bellary fort (Wight); Mysore or Canara (Law).
An erect herb similar to the last but with smaller heads and more slender peduncles.

3. ANISOCHILUS SCABER, Benth.; F. B. I. iv. 627.
W. Ghâts, hills of Tinnevelly and Travancore.
A herb with woody stems, rooting at the nodes, the branches ascending, usually with only single heads, sometimes reaching 3 in. long and purplish when dry, the corolla with long boat-shaped lower lip.

4. ANISOCHILUS PANICULATUS, Benth.; F. B. I. iv. 628. Trimen, Fl. Ceyl. t. 75.
Deccan, in Mysore? (G. Thomson); W. Ghâts, Eachadi Hills in S. Travancore (K. Venkoba Row), in dry forests.
An erect herb with stout stem and pale nearly white flowers.

5. ANISOCHILUS WIGHTII, Hook. f.; F. B. I. iv. 628.
W. Ghâts, Anamalai Hills (Wight, Barber).
An erect herb with narrow spikes, a small calyx and much bent, apparently pale, corolla.

6. ANISOCHILUS PLANTAGINEUS, Hook. f.; F. B. I. iv. 628.
Bababudan Hills of Mysore (Law).
A dwarf undershrub with a very thick rootstock and decumbent stems giving out short erect flower-bearing spikes, the fruiting calyx minute, villous.

7. ANISOCHILUS ARGENTEUS, Gamble in Kew Bull, 1924, ined.
W. Ghâts. Kodaikanal Ghât new road in the Pulneys (Bourne).
A rather stout undershrub with erect silvery branches and long spikes, the fruiting calyx minute, very tomentose, with rounded upper lip and incurved lower lip.

8. ANISOCHILUS VERTICILLATUS, Hook. f.; F. B. I. iv. 629.
Hyderabad, Golconda Hills (Beddome); Gairsoppa Falls, Mysore, 2,000–3,000 ft. (Meebold).
An erect herb, reaching 3 ft. in height, with deeply

grooved stems and pale blue flowers, the fruiting calyx very small, truncate.

9. ANISOCHILUS DYSOPHYLLOIDES, Benth.; F. B. I. iv. 628; Wt. Ic. t. 1434. *A. albidus*, Wt. Ic. t. 1436.

W. Ghâts, about Coonoor, 6,000 ft. in Nilgiris.

A thick undershrub with decumbent tomentose stems sending up short erect branchlets bearing spikes of usually white flowers.

Var. *purpureus*, Gamble. *A. purpureus*, Wt. Ic. t. 1435; Spic. Neilg. t. 195.

Leaves shorter and rather broader, often orbicular, the spikes stouter and more silky, the flowers white streaked with pink.

About Coonoor, on rocks (Wight), Pykara (Bourne).

10. ANISOCHILUS SERICEUS, Benth.; F. B. I. iv. 629.

W. Ghâts, Pulney Hills and hills of Tinnevelly.

A stout undershrub with long erect stems and slender conspicuously bracteate spikes. It is very near to the last species, but is evidently a much larger plant and the young shoots have dense rather large leaves.

11. ANISOCHILUS SUFFRUTICOSUS, Wt. Ic. t. 1437; F. B. I. iv. 628.

W. Ghâts, Nilgiri Hills, at Sispara, on rocky cliffs among grass, about 7,000 ft. (Wight, Gardner).

An erect thick woody undershrub reaching 3 ft. in height. the corollas whitish with pale lilac at the ends of both lips ('Wt. Spic. Neilg.,' t. 196).

12. ANISOCHILUS ROBUSTUS, Hook. f.; F. B. I. iv. 629.

W. Ghâts, hills of Tinnevelly, apparently about 6,000 ft. (Wight, Beddome, etc.).

A tall stout plant, perhaps shrubby, the stems subtetragonous, the leaves soft and thick, a very distinct species.

10. Hyptis, Jacq.

Herbs or shrubs. *Leaves* opposite. *Flowers* small or medium-sized, variously arranged, often capitate. *Calyx* ovoid campanulate or tubular, subequally 5-lobed, often accrescent. *Corolla*-tube cylindric; lobes 5, the lower lobe or lip deflexed and saccate, the others erect and spreading, flat. *Stamens* 4,

didynamous, declinate; filaments free; anther-cells confluent. *Disk* entire or glandular. *Ovary* 4-partite; style with a subentire or shortly bifid stigma. *Fruit* of 4 dry ovoid or oblong nutlets, smooth or rugulose; basal scar small.

HYPTIS SUAVEOLENS, Poit.; F. B. I. iv. 630.

Most plains Districts, on roadsides and waste ground, introduced from Tropical America and run wild.

A tall sweet-smelling herb with tetragonal hispid stems, ovate, cordate, denticulate leaves reaching 4·5 in. long and small blue flowers, the fruiting calyx campanulate and ribbed with 5 aristate teeth. Vern. *Hind.* Wilayati tulsi.

11. Lavandula, Linn.

Herbs or shrubs, often aromatic. *Leaves* opposite or whorled, entire dentate or pinnatisect. *Flowers* in 2–10-flowered whorls collected in simple or panicled spikes; bracts persistent. *Calyx* erect, tubular, 10–15-ribbed, shortly and equally 5-toothed. *Corolla* oblique, 2-lipped, the upper lip 2-fid, the lower 3-partite, the lobes all spreading. *Stamens* 4, didynamous, declinate, included; filaments free, anther-cells confluent. *Disk* with 4 lobes, opposite the ovary lobes. *Ovary* 4-partite; style 2-fid, the lobes flattened. *Fruit* of 4 dry smooth nutlets, the basal scar somewhat oblique, the back marked by a large white areole.

Leaves petioled, pinnatisect, the lobes broad, oblong; bracts ovate-lanceolate not awned, ribbed; fruiting calyx tubular, ·2–·3 in. long, villous with long hairs; corolla ·25 in. long.....1. *Gibsoni.*
Leaves sessile or nearly so, pinnatipartite, the lobes linear; bracts shortly ovate with a long capillary awn; fruiting calyx ·2 in. long, hoary-pubescent; corolla up to ·5 in. long.....2. *bipinnata.*

1. LAVANDULA GIBSONI, Grah.; F. B. I. iv. 631. *L. Lawii*, Wt. Ic. t. 1439.

   Nilgiri Hills (Perrottet).

   A tall undershrub with flowers in compact woolly spikes.

2. LAVANDULA BIPINNATA, O. Kze. *L. Burmanni*, Benth.; F. B. I. iv. 621; Wt. Ic. t. 1438.

   Deccan, in Canara, Mysore and Coorg; Ramandrúg Hills in Bellary.

   A slender erect herb with blue or white flowers in solitary or panicled spikes.

12. Pogostemon, Desf.

Herbs, undershrubs or shrubs, often aromatic. *Leaves* opposite, rarely ternate. *Flowers* small, in clusters or racemules in whorls on usually elongate spikes or racemes; the lower whorls often with floral leaves, the upper with bracts and bracteoles, the latter usually very small. *Calyx* more or less tubular, equally 5-lobed. the tube naked within, often enlarged in fruit. *Corolla*-tube included or exserted, 2-lipped, the upper lip 3-lobed, the lower narrower and longer. *Stamens* 4, exserted, subequal; filaments usually bearded; anther-cells confluent. *Disk* subentire. *Ovary* 4-partite; style slender, 2-fid with slender stigmatic lobes. *Fruit* of 4 smooth, ovoid or ellipsoid, dry nutlets, one face often angled.

Spikes or racemes of clusters terminal and axillary, forming a panicled inflorescence :—

Clusters interrupted in the spikes, except sometimes at the top :—

Clusters one-sided in the spikes with a pair of unequal small floral leaves, the rhachis usually elongate (even to 1 in. long), secund and curved, with many pairs of obliquely ovate imbricating ciliate bracts, enclosing the flowers and their narrower bracteoles; leaves in unequal pairs, membranous, ovate, acuminate, irregularly inciso-serrate, cuneate at base, appressed-pubescent, up to 5 in. long, 3 in. broad.....1. *paniculatus.*

Clusters not one-sided, globose, small, single or in pairs with small floral leaves, the rhachis not elongate, the bracts ovate or lanceolate, ciliate; leaves in usually equal pairs, membranous, glabrescent, ovate, acute or obtuse, simply or doubly crenate-serrate, cuneate at base, up to 4 in. long, 3 in. broad

2. *Heyneanus.*

Clusters close, interrupted towards the base of the not very paniculate spikes but continuous and regular and close above, the floral leaves reflexed; bracts ovate lanceolate, slightly falcate, ciliate, ·2 in. long, shorter than the calyx; calyx teeth about equal to the tube; leaves membranous, ovate or ovate-lanceolate, cuneate at base, inciso-serrate, softly hairy, up to about 5 in. long, 2 in. broad

3. *purpurascens.*

Clusters usually close but occasionally interrrupted especially in the terminal spikes of the panicle, the floral leaves mostly reflexed; bracts oblong-lanceolate, membranous, ciliate, ·2 in. long, usually longer than the calyx; calyx-teeth much shorter than the tube; leaves membranous, ovate, acuminate, cuneate at base, inciso-crenate, softly pubescent, up to 3 in. long, 1·5 in. broad 4. *Gardneri.*

Clusters close and densely packed on the branches of large panicles; leaves chartaceous, long-petioled, often doubly crenate, but scarcely incised :—

Stems and leaves nearly glabrous, also the floral leaves; imbricating short bracts slightly longer than the calyx; calyx-teeth much shorter than the tube; leaves ovate or ovate-lanceolate, acuminate, rounded or slightly cuneate at base, singly or doubly crenate-serrate, up to 3·5 in. long, 1·5 in. broad....5. *pubescens.*

Stems hoary-puberulous, leaves also on the under-surface; floral leaves and imbricating large and prominent bracts softly white- or tawny-pubescent; calyx-teeth much shorter than the rather slender tube; leaves ovate or ovate-lanceolate, acute, rounded or slightly cuneate at base, singly or doubly crenate, up to 6 in. long, 3 in. broad .....6. *plectranthoides.*

Spikes or racemes of clusters terminal or axillary, solitary, not panicled :—

Filaments of the stamens bearded :—

Leaves thin, coarsely crenate or serrate, the petioles long; herbaceous plants with slender branches :—

Leaves ovate, crenate, rounded or slightly cuneate at base, nearly glabrous as are the branchlets, about 2 in. long, 1·5 in. broad, racemes up to 4·5 in. long, ·3 in. in breadth, with distant whorls of clusters; fruiting calyx tubular, narrow, villous, deflexed, ·1 in. long, the lobes short; bracts and bracteoles minute.....7. *paludosus.*

Leaves ovate, acute, singly or doubly crenate or incised, rounded or broadly cuneate at base, hispid as are the branchlets with long cellular hairs, up to 2 in. long, 1·5 in. broad; racemes up to 6 in. long, ·5 in. broad, the whorls of clusters close above, sometimes interrupted below, especially the lowest when the floral leaves are large; fruiting calyx nearly glabrous, inflated, contracted at the much ciliate mouth, sometimes with straggling hairs, ·15 in. long, the lobes short; bracts and bracteoles linear 8. *Wightii.*

Leaves orbicular, obtuse, doubly crenate, rounded or cordate at base, villous with scattered hairs, 2 in. in diam.; racemes up to 1 in. long, ·75 in. broad, the whorls of clusters slightly interrupted; fruiting calyx tubular, villous, ·25 in. long, the lobes lanceolate; bracts and bracteoles linear-subulate..9. *rotundatus.*

Leaves ovate, subacute, crenate, rounded at base, very long tawny-villous or tomentose with shining hairs, up to 2 in. long, 1·25 in. broad; racemes 3–4 in. long, ·5 in. broad, the whorls

of clusters close; fruiting calyx tubular, villous like the leaves, the lobes acuminate: bracts lanceolate, bracteoles linear .....10. *nilagiricus.*

Leaves thick and tomentose, shortly crenate, the petioles short; undershrubs, woody at base and with short branches; bracts and bracteoles linear :—

Tomentum on the branchlets, leaves and racemes dark tawny; leaves ovate or orbicular, obtuse, rounded or shortly cuneate at base, crenate, ·5–1 in. rarely to 1·5 in. long; racemes up to 7 in. long, ·4 in. in diam., the whorls of clusters or short racemules usually crowded; fruiting calyx tubular, villous, ·15 in. long, the lobes short .....11. *mollis.*

Tomentum on the leaves and racemes pale tawny to nearly white, the branches with much soft woolly hair; leaves ovate, obtuse, truncate or cordate at base, crenate, rugose and impressed above, up to 1·5 in. long, 1 in. broad; racemes up to 3 in. long, ·75 in. in diam., the whorls of racemules rather crowded; fruiting calyx tubular, very tomentose, ·25 in. long, the lobes sharp.....12. *vestitus.*

Filaments of the stamens not bearded, but usually slightly villous at base :—

Calyx very densely villous, tubular, ·25 in. long, lobes short; corolla-tube slender, exserted; racemes up to 8 in. long, nearly 1 in. in diam., the whorls of racemules very crowded except one or two lower, spreading or reflexed; leaves ovate, acute, cuneate often unequally at base, doubly crenate, dark velvety on both sides, long-petioled, up to 4 in. long, 2 in. broad..13. *atropurpureus.*

Calyx glabrescent or with scattered long strigose hairs, ·25 in. long, lobes long-setaceous; corolla-tube slender, not exserted; racemes up to 6 in. long ·75 in. in diam., the whorls of racemules crowded except sometimes in the axils of separate large floral leaves below; leaves broadly ovate, acute, cordate at base, doubly crenate, sparsely hairy, long-petioled, up to 4 in. long, 3 in. broad.....14. *speciosus.*

Calyx glabrous, terete, ·2 in. long, the lobes triangular; corolla-tube funnel-shaped, exserted; racemes up to 6 in. long, the flowers reflexed on slender pedicels with minute bracts; leaves ovate, acute, rounded or slightly cuneate at base, doubly serrate, nearly glabrous, long-petioled, up to 5 in. long, 2 in. broad ....15. *travancoricus.*

1. POGOSTEMON PANICULATUS, Benth.; F. B. I. iv. 631.

W. Coast, from S. Canara to Travancore, up to about 3,000 ft. on the Ghâts.

An erect herb reaching 4 ft. in height, the flowers apparently white and small, the clusters sometimes, especially in young flowers, quite small and round, but in older plants much elongate and curved almost to a circle.

2. POGOSTEMON HEYNEANUS, Benth.; Wt. Ic. t. 1440. *P. Patchouli*, Hook. f. in F. B. I. iv. 653, *not of* Pelletier.

W. Ghâts, S. Canara southwards, in open forest land, often cultivated and then run wild; about Kotagiri in Nilgiris, 6,000 ft. (Wight).

A strongly aromatic herb with small flower clusters. The dried leaves are used to keep off insects.

3. POGOSTEMON PURPURASCENS, Dalz.; F. B. I. iv. 632.

W. Coast and W. Ghâts, S. Canara, Bababudan Hills of Mysore (Law).

An erect herb, the stems and branches covered with very soft spreading hairs, the leaves also soft and often in unequal pairs, sometimes tinged with purple, the corollas with purple upper lip and white lower lip.

4. POGOSTEMON GARDNERI, Hook. f.; F. B. I. iv. 632.

W. Ghâts, Wynaad (Gardner), Sispara in Nilgiris at about 5,000 ft. (Wight), Mankulam in Travancore Hills, 2,500 ft. (Venkoba Row).

A soft branching herb with reddish stems, all parts very villous

5. POGOSTEMON PUBESCENS, Benth. *P. parviflorus*, Benth.; F. B. I. iv. 632 *in part*.

W. Ghâts, Nilgiris, Anamalais and hills of Travancore, about 3,000–5,000 ft.; Kollimalai Hills of Trichinopoly.

A stout erect nearly glabrous herb. The corollas have the upper lip "white, shot with purple, the lower white, the filaments purple with purple hairs (T. Cooke)."

6. POGOSTEMON PLECTRANTHOIDES, Desf.; F. B. I. iv. 632.

N. Circars, Ganjam to Godavari, up to 3,000 ft. on Mahendragiri, in open places in deciduous forests; Deccan, Nallamalai Hills of Kurnool; W. Ghâts, S. Canara to Wynaad.

A large erect branching aromatic shrub, with conspicuous flower panicles and long-petioled leaves, the corollas pink or white, the filaments bearded with lilac moniliform hairs. The leaves have the scent of black currants.

7. POGOSTEMON PALUDOSUS, Benth.; F. B. I. iv. 635.
W. Ghâts, Nilgiris, in wet places near Ootacamund, 7,000 ft. (Wight), at Sispara, 6,000 ft. (Lawson).
A slender erect herb with nearly black stems, leaves also turning black when dry.

8. POGOSTEMON WIGHTII, Benth.; F. B. I. iv. 635. *P. hirsutus*, Wt. Ic. t. 1442, *not good and not of* Benth.
W. Ghâts, Nilgiris, Pulneys and Anamalai Hills, about 7,000 ft., in wet places.
An erect herb about 2 ft. high with reddish branches, the leaves black when dry. Flowers apparently white, with purple tufts of hair on the filaments.

9. POGOSTEMON ROTUNDATUS, Benth.; F. B. I. iv. 636.
Deccan (Heyne), locality not known.
A herb with erect branches from a procumbent base, two branches villous with white cottony hair, the leaves greenish-brown when dry.

10. POGOSTEMON NILAGIRICUS, Gamble n. comb. *P. rotundatus*, Wt. Ic. t. 1441, Spic. Neilgh. t. 197, *not of* Benth.
Nilgiris, on the downs at Ootacamund, 7,000 ft. (Bourne).
A soft herbaceous plant with white woolly hair on the stems.

11. POGOSTEMON MOLLIS, Benth.; F. B. I. iv. 635.
W. Ghâts, Nilgiri Hills, on the plateau above 6,000 ft., in rough places and the edges of shola forests, Pulney Hills and hills of Tinnevelly; Shevaroy Hills of Salem (Bourne).
A much branched low woody undershrub with white flowers.

12. POGOSTEMON VESTITUS, Benth.; F. B. I. iv. 636.
Deccan (Heyne), locality not known; W. Ghâts, Palghat (Wight).
A densely woolly undershrub with ascending branches up to about 18 in. long, the flowers lilac.

13. POGOSTEMON ATROPURPUREUS, Benth.; F. B. I. iv. 636.
W. Ghâts, Sispara Ghât in Nilgiris, at 6,000 ft., in moist forest.
An erect shrubby plant with velvety tawny branches having the hair reflexed, the flowers dark purple, the leaves and inflorescence dark rusty black when dry.

14. POGOSTEMON SPECIOSUS, Benth.; F. B. I. iv. 637; Wt. Ic. t. 1443.

W. Ghâts, Nilgiris and Anamalais, at 6,000–8,000 ft., on the edges of Shola forest.

A shrub, reaching 3 ft. in height with pilose-hispid brown branches, white flowers tinged with pink and leaves and inflorescence nearly black when dry. The very long stamens give a bottle-brush appearance to the racemes.

15. POGOSTEMON TRAVANCORICUS, Bedd. Ic. t. 159; F. B. I. iv. 637.

W. Ghâts, Atraimalai Ghât, Travancore. at 3,500 ft., Mankulam, 2,500 ft. (K. Venkoba Rao).

A subshrubby plant reaching 2 ft. in height, the branches smooth, the leaves and inflorescence black when dry.

13. Dysophylla, Blume.

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in dense long spikes or racemes of many whorled cymes; bracts and bracteoles many, usually small. *Calyx* ovoid or campanulate, equally 5-lobed, the throat naked within. *Corolla* very small, equally 4-lobed, the tube exserted or included. *Stamens* 4, exserted, straight or subdeclinate; filaments long, bearded; anther-cells confluent. *Disk* equal, subentire. *Ovary* 4-partite; style slender, 2-fid, the stigmatic lobes subulate. *Fruit* of 4 ovoid or oblong, smooth or rough, dry nutlets, the basal scar small.

Leaves opposite :—

Stems and leaves clothed with long soft tawny hair; leaves sessile or shortly petioled, elliptic-oblong or ovate-lanceolate, acute or obtuse, rounded at base, serrate, up to 3 in. long, nearly 1 in. broad; racemes spicate, 2–4 in. long, ·3–·5 in. broad, the flowers with slender pedicels and lanceolate or spathulate long-ciliate bracts; calyx minute, turbinate; corolla-tube exserted.....1. *auricularia.*

Stems and leaves closely pale-tawny or white silky tomentose :—

Spikes very slender, 1·5–4 in. long, about ·2 in. broad, the flowers minute with linear bracts; calyx very small, the lobes triangular; corolla-tube included; leaves subsessile, thick, linear-oblong, denticulate in the upper half, up to 1·5 in. long, ·3 in. broad 2. *myosuroides.*

Spikes about 2 in. long, ·25 in. broad, the flowers minute with oblong small bracts; calyx ·05 in. long, turbinate, gland-dotted, the teeth triangular, ciliate; corolla-tube included; leaves subsessile, linear-oblong, obtuse, crenate or subentire, up to 1·25 in. long, ·4 in. broad, fulvous-pubescent

Leaves in whorls, plants of wet places :—

Erect plants, not floating :—

Racemes single or in leafy panicles, dense, more or less closely grey-pubescent, up to 6 in. long, ·3 in. in diam. ; leaves linear-oblong or linear-lanceolate, shortly petiolate, serrate, the nerves oblique, up to 4 in. long, ·5 in. broad.....4. *quadrifolia.*

Racemes single, very dense, up to about 4 in. long, ·4 in. in diam. with a pair of short floral leaves at the base ; leaves in distant whorls, linear or narrowly linear-lanceolate usually entire, the margins revolute, strigosely hispid especially beneath, up to 2 in. long .....5. *cruciata.*

Water plants, often floating :—

Stems decumbent at base, glabrous, often geniculate ; leaves 4–5 in a whorl, sometimes more, soft and glabrous, linear, usually entire, up to 3 in. long, ·2 in. broad ; spikes very dense and villous, up to 2·5 in. long, ·2 in. in diam., the calyx tube 5-angled, glabrous, with incurved villous lobes .....6 *Griffithii.*

Stems creeping at base, then with many stiff erect branches with very short internodes ; leaves many in a whorl, very short, narrowly linear, entire, puberulous, up to ·5 in. long, ·1 in. broad ; spikes very dense and villous, up to 2·5 in. long, ·2 in. in diam., the calyx campanulate .....7. *stellata.*

1. DYSOPHYLLA AURICULARIA, Blume ; F. B. I. iv. 638 ; Wt. Ic. t. 1445.

   Deccan, hills of Mysore and Bellary ; Carnatic, Kollimalai Hills of Trichinopoly ; W. Ghâts, Nilgiris and Pulneys at 3,000–6,000 ft.

   An erect annual with pale lilac flowers.

2. DYSOPHYLLA MYOSUROIDES, Benth. ; F. B. I. iv. 638.

   Deccan, Ramandrûg in Sandur Hills, Bellary, at 3,500 ft. ; Bababudan Hills of Mysore ; Carnatic, base of Kambakam Hill, Chingleput.

   A much-branched perennial herb with a woody rootstock, the flowers red ; the main nerves of the leaves slender, very oblique.

3. DYSOPHYLLA RUGOSA, Hook. f. ; F. B. I. iv. 638.

   Carnatic, hills near Pallamcottah, Tinnevelly (Heyne).

   An erect perennial herb similar to the last and perhaps scarcely distinct, the main nerves of the leaves more distant and less oblique.

4. DYSOPHYLLA QUADRIFOLIA, Benth.; F. B. I. iv. 639.
N. Circars, hills of Godavari, up to 3,500 ft., in rocky places near streams and in grass savannahs; W. Ghâts, and W. Coast, S. Canara and Malabar to the Anamalais.
An erect aromatic undershrub reaching 4 ft. in height with rose-coloured flowers. There are two forms, one with long leaves drying nearly black and subglabrous, the other grey pubescent when dry with the leaves shorter. Vern. *Tel.* Konda-jajain.

5. DYSOPHYLLA CRUCIATA, Benth.; F. B. I. iv. 639. *D. tetraphylla*, Wt. Ic. t. 1444.
W. Coast, *perhaps* Malabar (Wight), in wet places.
A pretty erect herb with lilac or pale purple flowers, easily recognized by the regularly spaced whorls of usually 4 leaves with revolute margins. The stamens are bearded with pink or purple.

6. DYSOPHYLLA GRIFFITHII, Hook. f.; F. B. I. iv. 641.
N. Circars, wet places at Bamunpodor in Ganjam (Gamble).
An aquatic herb, rooting in mud or floating in water, the many spikes at the ends of the branches erect, the flowers pink.

7. DYSOPHYLLA STELLATA, Benth.; F. B. I. iv. 640.
W. Coast, S. Canara to Travancore, in rice-fields.
A pretty water plant with minute pink flowers and the stamens bearded with purple hairs.

Var. *gracilis*, T. Cooke. *D. gracilis*, Dalz.; F. B. I. iv. 641, taller and with rather more distant whorls or leaves, the stem also thicker with prominent nodal scars.
Canara and Mysore (Law).

14. Colebrookea, Smith.

A shrub, densely hoary or woolly. *Leaves* opposite or ternate, petioled, elliptic-oblong or -lanceolate, crenulate. *Flowers* small, functionally dioecious, in bracteate clusters on elongate spikes arranged in panicles. *Calyx*-tube very short; teeth subulate, in fruit elongate, capillary and feathery. *Corolla* small, tube very short, lobes 4, subequal. *Stamens* 4, exserted in ♂ flowers, included in ♀; filaments naked; anthers orbicular, the cells confluent. *Disk* uniform. *Ovary* 4-partite; style bifid, the lobes

subulate. *Fruit* of 1–4 obovoid dry nutlets with hairy tips, the basal scar small.

COLEBROOKEA OPPOSITIFOLIA, Sm.; F. B. I. iv. 642. *C. ternifolia*, Roxb. Cor. Pl. t. 245.

N. Circars, common in hilly forests up to 3,500 ft., chiefly in ravines; Deccan, in hill forests in Mysore; W. Ghâts, S. Canara to Travancore in dry forest localities.

An erect much-branched very white-tomentose shrub up to 10 ft. high, the flowers white, the fruiting panicles long-plumose, the leaves up to 8 in. long, ·3 in. broad, variable in pubescence. Bark grey, rather corky; wood greyish-white, close-grained.

15. Micromeria, Benth.

Herbs or undershrubs. *Leaves* usually small, entire or toothed. *Flowers* small, in axillary few-flowered cymes or in whorls sessile or peduncled on a terminal sometimes panicled raceme; bracts small. *Calyx* 10–13-nerved, 5-lobed or 2-lipped. *Corolla* 2-lipped, the tube straight, annulate within, the upper lip entire or emarginate, the lower spreading, 3-lobed. *Stamens* 4 didynamous, the lower pair the longer, ascending, incurved; anther-cells distinct, parallel, at length divergent, the connective usually thickened. *Disk* cup-shaped. *Ovary* 4-partite; style slender, 2-lobed at apex, the stigmatic lobes equal or the upper short and lower recurved, flattened. *Fruit* of 4 smooth, dry, ovoid or oblong nutlets, the basal scar small.

Stems short, dense, leafy, glabrous or slightly pubescent; leaves very small, ovate, nearly sessile, gland-dotted, ·15–·25 in. long; cymes 2–4-flowered, axillary, with slender pedicels.....1. *biflora.*
Stems tall, slender, pubescent; leaves shortly petioled, ovate or oblong, obtuse, serrate, ·5–1 in. long, ·5 in. broad; whorls dense-flowered, lower ones often peduncled, in long terminal racemes or spikes, tawny-villous .....2. *capitellata.*

1. MICROMERIA BIFLORA, Benth.; F. B. I. iv. 650; Wt. Ic. t. 1446.

N. Circars, hills of Vizagapatam, 3,500 ft. (A. W. Lushington); W. Ghâts, Nilgiris and Pulneys above 6,000 ft. common.

An aromatic herb with a very stout rootstock and many tufted ascending wiry stems, the flowers pink.

2. MICROMERIA CAPITELLATA, Benth.; F. B. I. iv. 649.
N. Circars, hills of Ganjam (Barber); W. Ghâts, Nilgiri Hills at 5,000–6,000 ft.
A very aromatic herb with long slender stems and small purplish flowers in very dense villous whorls.

16. Calamintha, Moench.

Herbs or shrubs. *Leaves* entire or toothed. *Flowers* small, in whorls, the whorls dense and axillary or loose and panicled or spicate; bracts small. *Calyx* ribbed, ribs usually 13, 2-lipped, the upper lip 3-, the lower 2-lobed and with narrower teeth; throat naked or villous. *Corolla* 2-lipped, the tube straight, the throat villous, the upper lip erect, entire or emarginate, the lower spreading, 3-lobed. *Stamens* 4, didynamous, the lower pair longer, ascending under the upper lip; anther-cells distinct, parallel or diverging. *Ovary* 4-celled, style slender, 2-fid, the stigmatic lobes equal or the lower larger. *Fruit* of 4 minute subglobose dry smooth nutlets; basal scar small.

CALAMINTHA UMBROSA, Benth.; F. B. I. iv. 650. *Melissa umbrosa*, Bieb.; Wt. Ic. t. 1447.
W. Ghâts, Nilgiri and Pulney Hills, on the downs and in moist woods at high levels.
A slender straggling laxly hairy herb procumbent at base, then ascending, with purplish or sometimes white flowers in axillary whorls, the leaves ovate, serrate, up to 1·5 in. long.

17. Anisomeles, R. Br.

Erect, branching coarse herbs, often very aromatic, the stems usually tetragonous. *Leaves* opposite, the floral leaves subsimilar. *Flowers* in axillary whorls of short spikes usually elongating in fruit, or of lax branching cymes, the whole often panicled; bracts linear, 2 to each flower. *Calyx* ovoid or tubular, straight, equally 5-lobed. *Corolla* 2-lipped, the tube short, annulate within; upper lip short, erect, entire; lower broad, spreading, 3-lobed, the midlobe large, bifid or emarginate. *Stamens* 4, didynamous, exserted, the lower pair longer; anthers of upper pair 2-celled, of lower 1-celled, the cells transverse and parallel. *Disk* equal. *Ovary* 4-partite; style slender, 2-fid, the

stigmatic lobes equal, subulate. *Fruit* of 4 smooth dry lenticular nutlets, the basal scar small.

Stem and branches acutely tetragonous; fruiting calyx prominently reticulate; filaments bearded :—

Cymes in the whorls pedunculate, in fruit elongate and unilateral; fruiting calyx scabrous and with scattered bulbous-based hairs, the lobes acuminate; leaves ovate, acuminate, cuneate at base, crenate-serrate, glabrous or sparsely hairy, up to 3 in. long, 1·5 in. broad ..... 1. *Heyneana.*

Cymes in the whorls sessile, shortly elongate in fruit; fruiting calyx hispid, the lobes caudate; leaves ovate, acute or acuminate, rounded or slightly cuneate at base, crenate, tomentose, up to 6 in. long, 3 in. broad ..... 2. *indica.*

Stem and branches obtusely tetragonous and softly white-tomentose as are the under-surfaces of the leaves; cymes in the whorls dense, shortly but sometimes much (up to 2 in.) elongate in fruit; fruiting calyx softly villous with shining hairs, the lobes narrowly lanceolate; leaves thick, lanceolate, acute, rounded at base, crenate-serrate, tomentose, up to 5 in. long, 2 in. broad ..... 3. *malabarica.*

1. ANISOMELES HEYNEANA, Benth.; F. B. I. iv. 672.

W. Ghâts, Nilgiri Hills (Wight), probably from Wynaad.

A tall erect herb reaching 5 ft. in height (Cooke). the corolla white or greenish-white.

2. ANISOMELES INDICA, O. Kze. *A. ovata*, R. Br.; F. B. I. iv. 672; Wt. Ic. t. 865.

All Districts, except very dry ones, in open forests, on waste land and by roadsides, up to about 5,000 ft., common. An almost shrubby herb reaching 6 ft. in height and smelling strongly of camphor. The corollas have a pale upper lip and purple lower lip and the stems and leaves vary from softly pubescent to velvety tomentose (var. *mollissima*, Benth.) and nearly white beneath. It is used in medicine.

3. ANISOMELES MALABARICA, R. Br.; F. B. I. iv. 673; Wt. Ic. 864.

S. Carnatic from Madras southwards to S. Travancore, West to the E. foot of the Ghâts, in low country.

An almost shrubby herb reaching 6 ft. in height, densely white woolly and with pale purple flowers. It is used in medicine. Vern. *Tel.* Moga-bira; *Tam.* Peyameratti.

18. Scutellaria, Linn.

Herbs or undershrubs. *Leaves* opposite; floral leaves usually small and bract-like. *Inflorescence* various, but often in pairs or whorls in a terminal raceme. *Calyx* campanulate, 2-lipped, the lips closed in fruit, the upper lip then deciduous, furnished on the back with a large shield or pouch, the lower lip persistent. *Corolla* 2-lipped, the tube usually sharply recurved above the calyx and then ascending, dilated at the throat, not annulate within; upper lip galeate, entire or notched, lower broad, 3-lobed. *Stamens* 4, didynamous, the lower pair longest; anthers connivent, those of upper pair 2-celled, of lower 1-celled. *Disk* elongate. *Ovary* 4-partite, oblique, on a curved gynophore; style slender, 2-fid, one stigmatic lobe very short. *Nutlets* 4, subglobose, smooth granular or tubercular.

Leaves chiefly radical, with sometimes a few distant pairs on the stem, elliptic, obtuse, rounded or cordate at base, crenate, pubescent, sometimes purple beneath, up to 4 in. long, 2·5 in. or more broad; petioles 1–3 in. long; racemes elongate, solitary or panicled, the floral leaves very small; nutlets minutely tuberculate ..... 1. *discolor.*

Leaves cauline, the floral leaves much smaller and bracteate:—

Erect, stiff plants, pubescent or hispid; leaves ovate, acute, cordate or rounded at base, crenate-serrate, hispid, often purplish beneath, up to 2 in. long, 1–1·5 in. broad, petiole slender, up to about 1 in. long; floral leaves ovate; racemes erect, up to 6 in. long; nutlets granulate ..... 2. *Wightiana.*

Straggling weak plants, glabrous or minutely pubescent:—

Slender branching flaccid flexuous herbs; leaves ovate, subacute, rounded or cordate at base, membranous, broadly crenate, up to 3·5 in. long, 2·5 in. broad, petiole 1–3 in., floral leaves lanceolate; racemes lax, up to 6 in. long; nutlets spinulose .... 3. *violacea.*

Many-branched soft thinly pubescent herbs; leaves deltoid, acute, truncate or cordate at base, rather thick, repand-crenate, minutely tomentose, 1–1·25 in. long and nearly as much broad, petiole ·5—·75 in.; floral leaves very small, ovate; racemes elongate, up to 6 in. long; nutlets minutely tuberculate 4. *Colebrookiana.*

Leaves cauline gradually smaller upwards as they pass into floral leaves, the lower shortly petioled, the upper sessile, ovate or lanceolate, obtuse, cordate or rounded at base, entire or slightly crenate, up to 1 in. long, ·5 in. broad; pedicels very short; nutlets granulate 5. *rivularis.*

1. SCUTELLARIA DISCOLOR, Coleb.; F. B. I. iv. 667.
   Bababudan Hills of Mysore (Law), Marnhalli, 2,000 ft. (Meebold).
   An annual herb, the stems rooting at the base, the flowers with pale blue corolla about ·5 in. long, the pouch of the upper fruiting calyx-lip short and broad.
2. SCUTELLARIA WIGHTIANA, Benth. *S. violacea*, Heyne, var. *hispidior*, Benth.; F. B. I. iv. 668; Wt. Ic. t. 1449.
   W. Ghâts, Nilgiri Hills, at about 5,000–7,000 ft.
   A stiff-branched but erect herb, the stems rooting at base, the corollas white or rose (Wight), ·5 in. long, the pouch of the upper fruiting calyx-lip deep and hooded.
3. SCUTELLARIA VIOLACEA, Heyne; F. B. I. iv. 668 *in part*; Bot. Mag. t. 8320.
   N. Circars, hills of Vizagapatam at 2,500 ft. (Beddome, A. W. Lushington), Rampa Hills of Godavari, at 4,000 ft. (V. Narayanswami); W. Ghâts, Nilgiris, Pulneys and hills of Travancore, up to 7,000 ft.
   A flaccid straggling herb, the pouch of the upper fruiting calyx-lip concave without, the corolla-tube long, blue with white patches on the lip.
4. SCUTELLARIA COLEBROOKIANA, Benth. *S. violacea* var. *Colebrookiana*, Hook. f.; F. B. I. iv. 668.
   W. Ghâts, Pulney Hills and hills of Tinnevelly, apparently at low levels.
   A straggling herb of characteristic aspect and soft thick deltoid leaves, the pouch of the upper fruiting calyx-lip usually concave without, the corolla large, especially the broad lower lip.
5. SCUTELLARIA RIVULARIS, Benth.; F. B. I. iv. 670; Wt. Ic. t. 1450.
   W. Ghâts, Nilgiris, in wet places near streams at about 7,000 ft., Pykara (Wight), Cairn Hill Swamp (Gamble).
   A nearly glabrous tufted herb with many branches, the lower one rooting below, the corolla lilac or blue and short, the pouch of the upper lip of the fruiting calyx broad and curved forward.

19. Brunella, Linn.

Perennial herbs. *Leaves* opposite; floral leaves bract-like. *Flowers* in whorls of 6, closely packed in terminal cylindric

heads. *Calyx* reticulate, white-strigose, 2-lipped, above a short tube closed in fruit; upper lip broad, 3-toothed, lower 2-lobed the lobes lanceolate, aristate. *Corolla* ascending, tube annulate at the base within; upper lip erect, galeate; lower lip spreading, the side lobes oblong deflexed, the middle lobe rounded, concave, crenulate. *Stamens* 4, didynamous, exserted; filaments bifid, especially the upper, at apex, the lower arm anther-bearing; anthers conniving, 2-celled, the cells divaricate. *Disk* erect. *Ovary* 4-partite, on a gynophore; style slender, 2-lobed, the stigmatic lobes subulate. *Fruit* of 4 smooth oblong nutlets.

BRUNELLA VULGARIS, Linn.; F. B. I. iv. 670. Var. *hispida*, Benth.; Wt. Ic. t. 1448.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 5,000 ft., in grass, on the downs.

A herb with creeping rootstock, the stems and ovate obtuse leaves hispidly hairy, the corollas deep purple-blue or sometimes white, the bracts broadly ovate-cordate, apiculate, often purple on the margins.

20. Leonurus, Linn.

Erect stout herbs. *Leaves* opposite, lobed, floral leaves similar. *Flowers* in dense axillary whorls; bracts subulate. *Calyx*-tube turbinate, 5-nerved; teeth 5, spreading, spinescent. *Corolla* 2-lipped; tube cylindric, annulate within; upper lip erect, entire, lower 3-lobed, the midlobe obcordate. *Stamens* 4, didynamous, the lower pair the longest; anthers conniving, the cells transverse. *Disk* uniform. *Ovary* 4-partite; style 2-fid, the stigmatic lobes obtuse or subulate. *Fruit* of 4 3-quetrous truncate, smooth nutlets, the basal scar small.

LEONURUS SIBIRICUS, Linn.; F. B. I. iv. 678.

Coorg, Nilgiri Hills and other localities, in waste places.

An annual weed with 4-gonous stems and long-petioled pinnati-partite leaves having linear-lanceolate segments. The flowers are red.

21. Leucas, R. Br.

Herbs, undershrubs or shrubs, nearly always pubescent or villous; branches usually 4-gonous. *Leaves* opposite or whorled; floral leaves usually similar. *Flowers* usually white, in axillary

few- or many-flowered whorls, rarely quite terminal; bracts usually many, linear or lanceolate, frequently enclosing the base of the whorls. *Calyx* tubular, 10-ribbed, the mouth straight or oblique, equally or unequally 6–10-toothed, often with a ring of hairs within the teeth, fruiting calyx often elongated. *Corolla* 2-lipped; tube included, annulate or naked within; upper lip erect concave externally, often densely and white- or tawny-villous, lower lip spreading, 3-lobed, the midlobe very large. *Stamens* 4, didynamous, the lower pair the longer; filaments ascending under the upper lip; anthers connivent, the cells divaricate, at length confluent. *Disk* entire or lobed, equal or glandular in front. *Ovary* 4-partite; style subulate at the apex, the upper lobe obsolete. *Fruit* of 4 ovoid triquetrous obtuse dry nutlets, the basal scar small.

Mouth of the calyx oblique :—

Longer side of the calyx-mouth anterior, tube prominently ribbed, reticulate and curved; bracts linear-lanceolate, ciliate; corolla-tube slender, ·2 in. long, the upper lip ·05, the lower ·1 in.; whorls up to 1 in. in diam. in most axils; leaves thin, ovate, acute, rounded or slightly cuneate at base, more or less pubescent, coarsely crenate-serrate, up to 2·5 in. long, 1·5 in. broad, petiole to 1 in. ..... 1. *urticaefolia.*

Longer side of the calyx-mouth posterior :—

Calyx-tube bent in the middle to curve outwards or downwards, the teeth long and slender :—

Calyx-tube sigmoidly curved, pubescent, ribbed and reticulate, the uppermost tooth nearly twice as long as the rest; bracts linear-lanceolate, villous, spinous-awned; corolla-lips nearly equal, short: whorls in most axils about 1 in. in diam.; leaves ovate or lanceolate, acuminate, cuneate at base, coarsely crenate-serrate, pubescent, up to 3·5 in. long, 1·5 in. broad, petiole to ·75 in. ..... 2. *martinicensis.*

Calyx-tube abruptly deflexed, villous, strongly ribbed, the teeth subequal; bracts thin, foliaceous, lanceolate, ciliate, ·2–·3 in. long; corolla with lower lip longer than upper; whorls in upper axils about ·75 in. in diam.; leaves oblong-lanceolate, obtuse, shallowly serrate, hispid, up to 2 in. long, ·5 in. broad, petiole very short ..... 3. *nutans.*

Calyx-tube erect, not bent in the middle :—

Mouth of the calyx-tube very oblique, the upper tooth long, the rest smaller :—

Bracts linear, finely pubescent, ·2–·3 in. long, not long-ciliate; calyx-tube with upper and lower halves similar, glabrous or short-pubescent, ·25 in. long; corolla with lower lip long and broad; whorls terminal and few at the ends of the branches, ·5–·75 in. broad; leaves linear or narrowly linear-lanceolate, obtuse, entire or slightly serrate, pubescent, up to 3·5 in. long, ·4 in. broad, petiole very short . . 4. *linifolia*.

Bracts linear, villous and long-ciliate :—

Calyx-tube uniform :—

Calyx prominently nerved and hispid, ·25 in. long, the teeth all sharp; corolla very small, the upper and lower lips nearly equal; whorls close together in the uppermost axils, scarcely ·5 in. in diam.; leaves sessile, linear, obtuse, entire or very distantly obscurely serrate, up to 2·5 in. long, ·25 in. broad . . . . . 5. *Wightiana*.

Calyx not prominently nerved, hispid, ·25 in. long, the teeth small; corolla large, the lower lip much longer than the upper, the midlobe broad; whorls terminal with one or more in adjacent axils as well, ·5–·75 in. in diam., leaves subsessile, linear or linear-lanceolate, entire or distantly obscurely serrate, up to 4 in. long, ·75 in. broad . . . . . 6. *zeylanica*.

Calyx-tube glabrous and membranous in the lower half, ribbed and hispid and with long bulbous-based hairs in the upper; corolla large, the lower lip twice as long as the upper, the midlobe obovate; whorls terminal and also sometimes in upper axils, dense, up to 1 in. in diam.; leaves linear- or oblong-lanceolate, obtuse, entire or crenate, pubescent, up to 3 in. long, ·5 in. broad, petiole short 7. *aspera*.

Mouth of the calyx-tube slightly oblique, the teeth subequal :—

Whorls very large, terminal, globose, 1–2 in. in diam.; bracts foliaceous, imbricate, lanceolate, green, membranous, ciliate, ·5–·75 in. long; calyx tubular, ·75 in. long, glabrous below, villous above; leaves ovate or ovate-lanceolate, obtuse, membranous, crenate, pubescent, up to 4 in. long, 1·5 in. broad, petiole to ·5 in. . . . . 8. *Cephalotes*.

Whorls small, under 1 in. in diam., mostly terminal; bracts stiff, linear, hispid and with few but prominent long bulbous-based bristles as on the calyx-tube :—

Calyx-teeth about ·1 in. long or longer, subulate, the tube white-villous, ribbed and bristly near the mouth, often

nearly glabrous below; leaves variable, linear or oblong, obtuse, hispid, up to 2 in. long, ·5 or sometimes ·75 in. broad, petiole very short.....9. *stricta.*
Calyx-teeth about ·025 in. long, triangular, the tube curved, ribbed, hispid and bristly; leaves linear or linear-oblong, obtuse, up to 1·5 in. long, ·3 in. broad, sessile
10. *diffusa.*

Mouth of the calyx straight :—
Calyx-teeth erect, rarely spreading, throat naked; whorls axillary:—
Whorls few-flowered, usually about 1–4 at any rate on each side; bracts setaceous :—
Calyx-teeth very short, ·05 in. long, triangular, tube obconical, ribbed, ·3 in. long, villous; leaves orbicular-ovate, obtuse, coarsely crenate, pubescent, 1 in. long, petiole to ·5 in., slender
11. *nepetaefolia.*
Calyx-teeth subulate, ·1 in. long, ciliate, tube campanulate, ribbed, ·2–·25 in. long, villous, leaves variable, ovate or elliptic, obtuse or acute, rounded or cuneate at base, crenate-serrate, rarely over 1 in. long, ·5 in. broad, the petiole short
12. *biflora.*
Whorls about 6- many-flowered, fewer on the branches than on main stems :—
Hairs on the branches erect or spreading, not deflexed, whole plant densely white-silky tomentose except the upper surface of the mature leaves usually softly villous only; calyx-teeth very short, about ·05 in., the tube ·25–·35 in.; leaves sub-sessile, thick, ovate or suborbicular, rounded at base, crenate-serrate, up to 2·5 in. long, 1·5 in. broad .....13. *lanata.*
Hairs on the branches deflexed :—
Calyx-teeth short, under ·1 in. long; bracts minute, linear.
Calyx-teeth subulate, about ·05 in. long, the tube campanulate, ribbed, softly white villous, slightly curved, ·25–·35 in. long :—
Leaves thick, ovate, obtuse, rounded at base, crenate, nearly glabrous above, densely white velvety tomentose beneath, up to 1·5 in. long, 1 in. broad, petiole very short.....14. *montana.*
Leaves rather thin, ovate or ovate-lanceolate, acute, cuneate at base, serrate, somewhat strigosely villous above, hoary-tomentose beneath, up to 4 in. long, 2 in. broad, petiole sometimes to nearly 1 in.
15. *mollissima.*

Calyx-teeth triangular, spreading, the tip spinulose, the tube funnel-shaped, ribbed, densely softly white-silky with a few long hairs, ·3–·5 in. long; leaves broadly ovate, acute or obtuse, cuneate at base, crenate or dentate, softly pubescent or tomentose, up to 2·5 in. long, 1·5 in. broad, petiole slender, ·25–1·25 in. ..... 16. *chinensis.*

Calyx-teeth usually over ·1 in. long, but unequal, so some shorter, all slender and subulate :—

Bracts subulate, ·25 in. long, shortly hispid; calyx-tube cylindric, hispid on the ribs, the teeth unequal, up to ·15 in. long; leaves triangular-ovate or -lanceolate, thin, acute, truncate rounded or almost cordate at base, coarsely crenate or serrate, pubescent, up to 3 in. long, 1·5 in. broad 17. *angularis.*

Bracts narrowly lanceolate or spathulate, acuminate, ·4 in. long, long-ciliate; calyx-tube campanulate, hispid on the ribs, the teeth subequal, up to ·1 in. long; leaves ovate or orbicular, thin, usually obtuse, truncate at base, coarsely crenate, pubescent, 1–1·5 in. in diam., petiole to ·5 in. ..... 18. *pubescens.*

Bracts filiform with long soft silky hairs, ·5 in. long; calyx tubular, softly silky, the teeth unequal, up to ·15 in. long, filiform; leaves thick, often tawny and rugose or bullate beneath when old, thinner and white-tomentose when younger, rounded or cordate at base, crenate, up to 2 in. long, 1·5 in. broad, petiole slender, ·25–·5 in. long 19. *marrubioides.*

Calyx-teeth erect and usually stellately spreading, throat villous; whorls chiefly terminal, but sometimes also in upper axils :—

Leaves quite entire :—

Leaves at most 1–1·5 in. long, narrow, obtuse, coriaceous, with revolute margins :—

Branches fulvous, calyx fulvous- or white-tomentose :—

Leaves linear, ·5–1 in. long, ·1–·2 in. broad, white-tomentose beneath :—

Stems and leaves scaly and hispid with erect or spreading hairs; whorls 1–2 at the top of scapiform branches 6–10 in. long; bracts setaceous, villous, ·125 in. long; calyx-teeth minute, about ·025 in. long, the throat ring of hairs as long ..... 20. *suffruticosa.*

Stems and leaves closely appressed-villous; whorls usually 2 at the ends of slender subterminal internodes

1–2 in. long; bracts subulate, ·1 in. long; calyx-teeth minute, ·025 in. long, the throat ring of hairs as long
21. *ternifolia.*

Leaves linear-oblong, 1–2 in. long, ·2–·4 in. broad, white or tawny beneath; above fulvous-villous like the stems, with erect hairs; whorls many, crowded at the ends of the branches; bracts subulate, ·25 in. long; calyx-teeth minute, ·025 in. long, the throat ring of hairs long and dense .....22. *helianthemifolia.*

Branches greenish-grey, strigose with erect hairs; leaves linear, obtuse, 1–2 in. long, ·1–·15 in. broad, grey-villous beneath; whorls usually single, terminal or axillary on short peduncles; bracts linear-oblong, strigose, ·2–·3 in. long; calyx-teeth triangular, ·04 in. long, shorter than the prominent throat ring of hairs.....23. *rosmarinifolia.*

Leaves up to 4 in. long, 1 in. broad, soft, chartaceous, lanceolate, scaberulous above, white-tomentose beneath, the margins very slightly revolute; whorls about 1 in. in diam., axillary to the 3–5 uppermost nodes; bracts linear, thick, ·4 in. long; calyx-teeth very small but longer than the ring of hairs ..24. *lanceaefolia.*

Leaves more or less serrate or crenate :—

Upper lip of corolla densely bearded with rufous hairs, villi of the calyx-throat white; whorls usually 1 or 2 terminal, large; bracts linear :—

Leaves lanceolate, acute, narrowed at base, crenate-serrate, tawny-villous, up to 4 in. long, 1·5 in. broad, petiole short; calyx-teeth short .....25. *vestita.*

Leaves membranous, ovate, acute, narrowed at base, coarsely serrate, pubescent or glabrate, up to 5 in. long, 2·5 in. broad, petiole to 1 in.; calyx-teeth slender, spreading, ciliate, ·1 in. long or longer.....26. *ciliata.*

Upper lip of corolla densely bearded with white hairs; hairs of the stem and branches usually stiff, spreading or reflexed :—

Leaves thick, 3–5 in. long, ovate, acute, rounded or cordate at base, crenate, tawny-villous above, softly whitish-tomentose beneath, 1·5–2·5 in. broad; whorls large, usually 1–2 terminal, 1 in. in diam.; bracts linear-lanceolate, ·4 in. long; calyx-teeth slender, ·075 in. long, spreading..27. *lamiifolia.*

Leaves narrow, usually under 1 in. broad, subobtuse, distantly and shallowly crenate, the nerves few, very oblique :—

Leaves rather thick, oblong, tawny-pubescent, 1–3 in. long, shortly petioled; whorls 1–2 terminal, ·75–1 in. in

diam.; calyx-teeth subulate, spreading, about ·05 in. long; bracts linear-lanceolate .....28. *hirta.*
Leaves thick, linear-oblong or lanceolate up to 4 in. long, 1 in. broad, crenate, the 5–7 pairs of main nerves very oblique, impressed above, brown-hispid-pubescent, the hairs spreading; whorls many, in upper axils, up to 1 in. in diam.; calyx-teeth short, subulate, the villi conspicuous; bracts linear, pectinately ciliate..29. *eriostoma.*
Leaves thin, linear-oblong, nearly glabrous, up to 4 in. long, shortly petioled; whorls several in upper axils, ·75 in. in diam.; calyx-teeth recurved, very short, about ·025 in. long; the tube much constricted in the middle; bracts filiform.....30. *stelligera.*
Leaves small, ovate, obtuse, rounded at base, crenate, tawny-hispid-pubescent, up to 1 in. long, ·5 in. broad, the nerves about 4–5 pairs, not oblique, petiole to ·3 in.; whorls single, terminal, ·75 in. in diam.; bracts subulate, ·3 in. long, ciliate; calyx-teeth stiff and with stiff hairs, ·1 in. long, as long as the dense villi; the tube ·25 in. long..31. *prostrata.*

1. LEUCAS URTICAEFOLIA, R. Br.; F. B. I. iv. 680; Wt. Ic. t. 1451.
Deccan and Carnatic, on dry waste lands, often on black-cotton soil, common about Coimbatore, also about Tadpatri in Anantapur.
A soft annual herb with white flowers, the nutlets trigonous with the truncate top glandular.
2. LEUCAS MARTINICENSIS, R. Br.; F. B. I. iv. 688.
Deccan and Carnatic, Horsleykonda at 4,000 ft., Ramandrúg in Bellary at 3,000 ft., hills of Salem and Coimbatore Districts, doubtfully indigenous.
A large herb with angular stems and white flowers, the nutlets trigonous with rounded back.
3. LEUCAS NUTANS, Spreng.; F. B. I. iv. 688.
N. Circars, in Ganjam (Barker); Deccan, in Cuddapah (Gamble).
A dwarf trailing herb, diffusely branched, with angular stems and white flowers.
4. LEUCAS LINIFOLIA, Spreng.; F. B. I. iv. 690.
N. Circars, Deccan and Carnatic, in pastures, waste lands and fallow fields, common.
An erect herb with rather large white flowers.

5. **Leucas Wightiana**, Benth.; F. B. I. iv. 690.
Carnatic and S. Travancore, at Cape Comorin (Lawson).
A small erect scabrid herb.

6. **Leucas zeylanica**, R. Br.; F. B. I. iv. 689; Wt. Ill. t. 176.
W. Ghâts, Nilgiris, Pulneys and hills of Travancore 3,000–7,000 ft.; Shevaroy Hills of Salem.
A large erect pubescent or hispid herb with white flowers.

7. **Leucas aspera**, Spreng · F. B. I. iv. 690.
Most plains Districts, and up to 3,000 ft., in fields and on waste land and roadsides, common.
A coarse erect diffusely branched annual herb with white flowers, the stems hispid or scabrid.

8. **Leucas Cephalotes**, Spreng.; F. B. I. iv. 689; Wt. Ic. t. 337 (not good).
All plains Districts; a weed of cultivated land.
A stout coarse herb with large terminal many-bracted conspicuous heads of white flowers, the corollas with the lower lip not much longer than the white-bearded upper.
Vern. *Hind.* Dhurpi Sâg.

9. **Leucas stricta**, Benth.; F. B. I. iv. 688.
N. Circars, Ganjam to Godavari, near the coast; Deccan, in the Ceded Districts, Mysore and Salem.
A small herb with 4-angled hispid slender stems and white flowers, the corollas with large obovate lower lip, much longer than the white-bearded upper.

10. **Leucas diffusa**. Benth.; F. B. I. iv. 689.
E. Coast Districts, from the Godavari southwards, usually on sandy pastures near the sea; Shevaroy Hills (Perrottet).
A small diffuse herb with trailing branches and rather large white flowers.

11. **Leucas nepetaefolia**, Benth.; F. B. I. iv. 691.
Deccan, Hyderabad journey (Heyne); Guntur District, at Bellamkonda (Cleghorn).
A shrubby plant with hoary branchlets, the flowers white, the lower lip of the corolla hardly longer than the white-bearded upper.

12. **Leucas biflora**, R. Br.; F. B. I. iv. 683; Wt. Ic. t. 866.
Deccan and Carnatic and the lower E. slopes of the Ghâts, southwards to S. Travancore; dry places on the W. Coast.

A slender procumbent softly pubescent herb, often straggling up and apparently climbing, the branches long, 4-angled, the flowers usually in pairs, corollas white.

Var. *procumbens*. *L. procumbens*, Desf.; F. B. I. iv. 683. Glabrous and with usually narrower leaves, shorter calyx-teeth and longer pedicels, but scarcely separable from the species.

Hills of S. Canara and Mysore.

13. LEUCAS LANATA, Benth.; F. B. I. iv. 681.

Hills of the Deccan and Carnatic, in dry places at low levels. N. slopes of Nilgiris, up to 3,000 ft.

An erect plant with many silky branches from a stout rootstock, the corollas rather large, white, with broad lower lip, longer than the white-bearded upper.

14. LEUCAS MONTANA, Spreng.; F. B. I. iv. 682.

N. Circars, on Mahendragiri, 4,500 ft. (Gamble), hills of Vizagapatam; Deccan, Kambakam Drúg, Ramandrúg in Bellary, at 3,000 ft.; N. side of Nilgiris at 3,000 ft.

A straggling undershrub with white flowers.

Var. *Wightii*, Hook. f. Calyx funnel-shaped, nearly ·5 in. long, upper surface of leaves strigose, whorls many-flowered. Locality doubtful (Hb. Wight).

15. LEUCAS MOLLISSIMA, Wall.; F. B. I. iv. 682.

Var. *scaberula*, Hook. f.

N. Circars, forests of Ganjam and Vizagapatam; Rampa and Bison Hills of Godavari, to 2,000 ft.; hills of Mysore (Meebold).

A straggling slenderly branched herb, sometimes climbing among bushes, the flowers white. Young leaves are often very silky, but the tomentum disappears as they get older and larger.

16. LEUCAS CHINENSIS, R. Br.; F. B. I. iv. 681.

W. Ghâts, hills of Malabar, Anamalai and Pulney Hills, at 3,000–4,000 ft. or higher.

A somewhat shrubby straggling plant very variable in thickness of leaf and clothing, probably according to light and shade, the corollas white with the lower lip rather longer than the upper. The calyx-tube is villous on the upper half within but is not fringed at the mouth.

17. LEUCAS ANGULARIS, Benth.; F. B. I. iv. 684. *L. marrubioides*, var. *pulneyensis*, Hook. f.; F. B. I. iv. 684.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, in evergreen forests at 3,000–5,000 ft. and perhaps higher.

A herbaceous plant with long straggling branches and rather large white flowers.

18. **Leucas pubescens**, Benth.; F. B. I. iv. 684.

Without locality (Wight); Nilgiris, at 5,000 ft. (Clarke)?

An erect herb with characteristic round broadly crenate leaves and white flowers.

19. **Leucas marrubioides**, Desf.; F. B. I. iv. 683.

W. Ghâts, hills of Mysore and N. Coimbatore, Nilgiris, at 3,000–7,000 ft., less common in Pulneys (Wight).

A stout straggling herb, the flowers white and large in very white-silky whorls with rather long internodes, the old leaves with the nerves impressed.

20. **Leucas suffruticosa**, Benth.; F. B. I. iv. 685; Wt. Ic. t. 1454.

W. Ghâts, Nilgiri Hills, on the downs at and about 7,000 ft.

A low undershrub with many slender stems from a thick woody rootstock, the corolla white, the upper lip prominently white-bearded.

21. **Leucas ternifolia**, Desf. *L. helianthemifolia*, Hook. f.; F. B. I. iv. 685 *in part.*

W. Ghâts, Anamalais, Pulneys and hills of Travancore, at high levels, above 6,000 ft.

An undershrub with conspicuous smooth golden pubescence, having many slender branches from a stout rootstock. The whorls resemble those of the last species but they have not the long peduncle-like internodes.

22. **Leucas helianthemifolia**, Desf.; F. B. I. iv. 685 *in part.* *L. ternifolia*, Wt. Ic. t. 1453, *not of* Desf.

W. Ghâts, Nilgiri Hills, at 5,000–7,000 ft., Pulneys scarce.

A small shrub, with very white or tawny wool on the inflorescence, only the upper surface of the leaves green. The corollas are white and the white wool of the upper lip very thick. The leaves are usually ternate or, as Wight says, ternate below, opposite above.

23. **Leucas rosmarinifolia**, Benth.; F. B. I. iv. 685; Wt. Ic. t. 1455

W. Ghâts, Nilgiri Hills, above 6,000 ft., often on roadsides.

A grey-green rather compact small shrub with the narrow leaves fascicled, many together, at the nodes. Flowers white in very silky whorls with rather large bracts.

24. LEUCAS LANCEAEFOLIA, Desf.; F. B. I. iv. 685; Wt. Ic. t. 1452.

W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft., more or less gregarious on the margins of Shola woods.

A shrub, reaching 6–8 ft., and very bushy. Flowers white, rather small. Bark thin, grey; wood light brown. Some of the Pulney specimens show very faint shallow crenatures to the leaves.

25. LEUCAS VESTITA, Benth.; F. B. I. iv. 686; Wt. Ic. t. 338.

S. E. Wynaad (Lawson); Pulney Hills and hills of Tinnevelly and Travancore, at low levels.

A tall tawny-villous soft herb with white lower lip to the corolla, the rufous upper lip characteristic.

26. LEUCAS CILIATA, Benth.; F. B. I. iv. 687.

W. Ghâts, hills of S. Canara, Coorg, Mysore, to the S.E. Wynaad at 3,000 ft.

A straggling aromatic loosely branched herb, the corolla with upper lip clothed with yellowish-brown hairs (Cooke), the whorls very scabrous hispid.

27. LEUCAS LAMIIFOLIA, Desf.; F. B. I. iv. 686.

W. Ghâts, Nilgiris, at 6,000 ft.; common in "Old Forest," Coonoor.

A large straggling herb with tawny villous stem and leaves.

28. LEUCAS HIRTA, Spr.; F. B. I. iv. 687.

Deccan, in hilly country, up to 4,000 ft. on Horsley-konda; W. Ghâts, in all Districts from S. Canara to Tinnevelly.

A sub-shrubby branching herb from a stout rootstock, the leaves and stems variable in pubescence.

Var. *Beddomei*, Hook. f. Softly villous with spreading hairs the whorls more numerous, the villi of the calyx-mouth fewer and shorter. The hairs on the corolla upper lip seem to have a brown tinge.

Hills of S. Canara and Wynaad at 5,000–6,000 ft. (Beddome).

29. LEUCAS ERIOSTOMA, Hook. f.; F. B. I. iv. 686.

W. Ghâts, in S. Canara (Barber), Wynaad (Heyne, de Montholon), Brumagiri Hills, 4,000–5,000 ft. (Fischer).

An undershrub with long narrow leaves, probably not very distinct from *L. hirta*, Spr.

Var. *latifolia*, Hook. f. Stouter and with many and larger whorls, the leaves broader. Nilgiri or Coorg (G. Thomson).

Var. *lanata*, Hook. f. Branches and inflorescence clothed with long soft white spreading hairs, the whorls smaller.

Bababudan Hills of Mysore, also Nilgiris (Wight, Meebold).

30. LEUCAS STELLIGERA, Wall.; F. B. I. iv. 686. *L. eriostoma*, var. *longifolia*, Hook. f.; F. B. I. iv. 686.

W. Ghâts, hills of S. Canara and Mysore to Nilgiris, up to 3,000 ft.

An erect branching herb with usually simply pubescent stems, sometimes with long spreading hairs.

31. LEUCAS PROSTRATA, Gamble n. comb. *L. hirta*, Spr., var. *prostrata*, Hook. f.; F. B. I. iv. 687.

W. Ghâts, Nilgiris, above 5,000 ft., Anamalais (Beddome): Shevaroy Hills.

A low herb, with many hispid prostrate branches from a knotty rootstock, often rooting at the nodes, the scapes sometimes long and slender.

22. Leonotis, R. Br.

Herbs or shrubs, stems 4-gonous. *Leaves* opposite; floral leaves similar but smaller. *Flowers* large, scarlet or yellow, in axillary dense many-flowered whorls; bracts numerous, slender. *Calyx* 10-ribbed, tubular, the tube often incurved; mouth oblique with 8–10 rigid teeth, the upper tooth the largest. *Corolla* 2-lipped, the upper lip long, concave, with a villous crown, the lower lip small, 3-lobed, the mid-lobe largest. *Stamens* 4, didynamous, the lower pair longer, ascending; anthers connivent, the cells divaricate. *Disk* equal. *Ovary* 4-partite; style subulate, the upper lobe very short. *Fruit* of 4 oblong ovoid or obovoid, triquetrous, obtuse or truncate, dry nutlets, the basal scar small.

x 1 in. long in all, the tube curved, the teeth very unequal and ed with slender spines, the uppermost much the largest; corolla . long, the upper lip ·5 in.; leaves broadly ovate, long-petioled, o 8 in. long, 5 in. broad, coarsely serrate.....1. *nepetaefolia.*
x ·5—·75 in. long, the tube straight, the teeth very small subequal; lla 2 in. long or more, the upper lip nearly 1 in.; leaves oblong-eolate, short-petioled, obtuse and shortly serrate.....*Leonurus.*

EONOTIS NEPETAEFOLIA, R. Br.; F. B. I. iv. 691; Wt. Ic. t. 37.

Most plains Districts, on roadsides and in waste places, chiefly near villages, often cultivated, doubtfully indigenous. A tall herb reaching 6 ft. high with obtusely 4-angled stems, long internodes and spinous whorls of orange-scarlet flowers, the upper lip densely woolly.

. *Leonurus*, R. Br., is sometimes found in gardens and is ly recognized by the very long orange-scarlet handsome olla. It is native of S. Africa.

23. Salvia, Linn.

erbs or shrubs of various habits. *Flowers* small or large showy, whorls usually racemose or spicate; bracts small or e and often coloured. *Calyx* tubular or campanulate, oped, throat naked; upper lip entire or 3-lobed, lower 2-fid. *olla* 2-lipped; tube naked or with a ring of hairs inside; er lip erect, entire; lower 3-lobed, the lateral lobes spreading. *nens* 2 (the lower pair) perfect, the upper pair reduced to ninodes or obsolete; filaments short, articulate with the der connective, sometimes produced beyond the joint; ners dimidiate, connective linear, transverse, the posterior ascending and bearing a linear fertile cell, the anterior arm ight or deflexed, with a fertile or empty cell or naked. *Disk* ally enlarged in front. *Ovary* 4-partite; style shortly bifid, lobes equal or the anterior longer. *Fruit* of 4 ovoid-triangular smooth nutlets, the basal scar small.

ALVIA PLEBEIA, R. Br.; F. B. I. iv. 655.

Most plains Districts, a weed of roadsides and waste land.

An erect pubescent herb with very small lilac or white flowers in whorls in panicles of slender racemes especially

in fruit when the calyx is much enlarged. Leaves petioled, oblong-lanceolate or -spathulate, crenate, 2–5 in. long. Nutlets mucilaginous when wetted.

Salvia officinalis, Linn., is the Sage plant occasionally cultivated in gardens. Several species are also cultivated in gardens for their showy flowers.

24. Gomphostemma, Wall.

Herbs or undershrubs, stellately pubescent or tomentose, the roots often bearing tubers. *Leaves* opposite, large, entire or dentate or crenate, floral leaves similar or bract-like. *Flowers* rather large, usually yellow, in short cymes forming whorls which are axillary or in dense terminal spikes; bracts many, usually linear. *Calyx* campanulate, equally 5-lobed, 10-ribbed. *Corolla* 2-lipped; tube slender, the throat more or less dilated; upper lip hooded, lower broadly 3-lobed, the lobes spreading. *Stamens* 4, didynamous, ascending, the lower pair the longer; anthers approximate in pairs, 2-celled, the cells parallel. *Disk* uniform or slightly swollen. *Ovary* 4-partite, style slender, 2-fid, the lobes subulate, nearly equal. *Fruit* of 4, or, by reduction, 3–1 glabrous or pubescent, corky or fleshy nutlets, the basal scar broad.

Whorls combined in terminal spikes, sometimes with others axillary in upper nodes as well; floral leaves elliptic-ovate, cordate; calyx-lobes lanceolate, acuminate, ·5 in. long; corolla-tube ·4 in. long, slender, lower lip as long, broad; leaves elliptic ovate, subacute, rounded and then abruptly and acuminately decurrent on the petiole, closely serrate, shortly hirsute above, densely tomentose beneath, up to 9 in. long, 5 in. broad ..... 1. ***Heyneanum.***

Whorls axillary; calyx-teeth slender, corolla-tube elongate :—

Cymes of the whorls pedunculate; calyx-teeth subulate, very grey stellate hairy, ·2 in. long; corolla 1 in. long, glabrate; floral leaves lanceolate; bracts linear; leaves elliptic to oblanceolate, acuminate, distantly shallowly crenate, up to 9 in. long, 4·5 in. broad ..... 2. ***parviflorum.***

Cymes of the whorls sessile; calyx-teeth very slender, ·15–·25 in. long, subglabrous; corolla 1 in. long, villous without; floral leaves ovate; bracts lanceolate; leaves elliptic-oblong or lanceolate, acute, sharply dentate, up to 6 in. long, 2 in. broad

3. ***eriocarpon.***

1. GOMPHOSTEMMA HEYNEANUM. Wall.; Wt. Ic. t. 1456; Prain, Ann. Calc. iii. t. 79. *G. strobilinum*, Wall., var. *Heyneana*, Hook. f.; F. B. I. iv. 696.

   W. Ghâts, S. E. Wynaad at 3,000 ft. (Lawson), Anamalai Hills at 3,000 ft. (Gamble), evergreen forests of Travancore (K. Venkoba Row), hills of Tinnevelly.

   A tall shrubby herbaceous plant, covered with stellate hairs, the flowers yellow (Lawson, Gamble), blue with purple tinge (Wight), the nutlets glabrous.

Var. *Rottleri*, Prain, Ann. Calc. iii. t. 80. Leaves crenate, the upper surface less hirsute, the stems furrowed.

W. Ghâts, Mudumalai forest at 2,000 ft. (Gamble), Anamalai Hills (Barber), hills of Travancore and Tinnevelly (Rottler, Wight).

2. GOMPHOSTEMMA PARVIFLORUM, Wall.; F. B. I. iv. 697; Prain, Ann. Calc. iii. t. 87 (var. *farinosa*).

   N. Circars, hills of Ganjam at 3,000 ft. (Barber), Rangalu in Vizagapatam at 3,400 ft. (A. W. Lushington).

   An erect large herb, softly stellate tomentose, the flowers yellow.

3. GOMPHOSTEMMA ERIOCARPON, Benth.; F. B. I. iv. 698; Prain, Ann. Calc. iii. t. 90. *G. oblongum*, Wt. Ic. t. 1457, *not of* Wall.

   W. Ghâts, Anamalai Hills and hills of Travancore and Tinnevelly, at about 2,000 ft., in evergreen forests.

   A slender erect herbaceous plant with simple or stellate hairs, the flowers yellow, the nutlets tomentose.

25. Teucrium, Linn.

Herbs or shrubs. *Leaves* opposite, entire serrate or lobed, floral leaves often bract-like. *Flowers* usually small, in whorls of 2–6, in axillary or terminal spikes, racemes or heads. *Calyx* 2-lipped, 10-ribbed; teeth 5, the uppermost usually largest. *Corolla*-tube not annulate; limb 1-lipped, the 2 upper and the lateral lobes short or even obsolete, the end lobe large. *Stamens* 4, didynamous, the lower pair longest, all exserted; anthers reniform, the cells short, at length confluent. *Disk* equal. *Ovary* 4-lobed; style bifid, the lobes subequal. *Fruit* of 4 obovoid rugosely reticulate nutlets, the scar oblique or lateral, large.

Inflorescence densely villous with tawny often glandular hairs, the racemes in close panicles; bracts lanceolate; upper and side lobes of corolla-lip short and rounded:—

Leaves thin, ovate, acute, truncate or cuneate and entire at base, rest serrate or crenate, often doubly, sparsely pubescent above, more so beneath, up to 3 in. long, 2 in. broad, petiole slender, ·5–1·5 in. long ..... *tomentosum.*

Leaves thick, ovate, obtuse, rounded or cordate at base, crenulate, rugose and strigosely hairy on both surfaces, up to 1·5 in. long, 1 in. broad, petiole stout, ·25–·5 in. long ..... 2. *Wightii,*

Inflorescence with few glandular hairs, glabrescent, the racemes in slender leafy panicles; bracts linear-lanceolate; upper lobes of corolla lip curved acuminate, side lobes acute; leaves thin, ovate, acute, rounded or cordate at base and then often acutely decurrent, sharply serrate, nearly glabrous above, minutely puberulous beneath, up to 2 in. long, 1·5 in. broad, petiole slender, ·5–·75 in. long

3. *plectranthoides.*

1. TEUCRIUM TOMENTOSUM, Heyne; F. B. I. iv. 709.

W Ghâts, Nilgiris, Pulneys and hills of Tinnevelly and Travancore, up to about 5,000 ft.; Bababudan Hills of Mysore; Kollimalai Hills of Trichinopoly.

An erect copiously flowering herb reaching 3 ft. in height, the flowers apparently yellowish (Benth.), the nutlets globose, granulate.

2. TEUCRIUM WIGHTII, Hook. f.; F. B. I. iv. 701. *T. tomentosum,* Wt. Ic. t. 1458, *not of* Heyne.

W Ghâts, Nilgiri Hills about Doddabetta at 7,000–8,000 ft., in dry rocky places.

A thick stout herb with short branches and pale purple flowers (Fyson).

3. TEUCRIUM PLECTRANTHOIDES, Gamble in Kew Bull., 1924, ined.

W. Ghâts, near Sengalteri, Tinnevelly (Hb. Madr.).

A slender erect herb with 4-angled stems, almost glabrous and with the flowers in spreading panicles of open racemes, the corolla rather large.

26. Ajuga, Linn.

Herbs, often decumbent or stoloniferous. *Leaves* opposite, usually coarsely toothed, floral leaves subsimilar. *Flowers* sessile

in 2- or more-flowered whorls, axillary or in terminal leafy spikes. *Calyx* 5-lobed, lobes subequal. *Corolla* 2-lipped; tube often annulate within, straight or dilated and curved; upper lip short, 2-fid, lower lip spreading, the mid-lobe largest. *Stamens* 4, didynamous, ascending, the lower pair longest, exserted or included; anthers 2-celled, the cells divaricate, at length confluent. *Disk* uniform or swollen behind. *Ovary* 4-lobed; style slender, 2-fid, the stigmatic lobes nearly equal. *Fruit* of 4 obovoid rugosely reticulate nutlets, the scar lateral, large.

AJUGA MACROSPERMA, Wall.; F. B. I. iv. 704.

N. Circars, in Ganjam, up to 4,500 ft. on Mahendragiri (Beddome, Gamble, Barber).

A decumbent villous herb with blue flowers, the leaves soft, ovate or ovate-oblong, coarsely dentate, up to 4 in. long, 2 in. broad.

Nepeta ruderalis, Ham., is an aromatic herb believed to be occasionally found on roadsides and waste lands in Northern Districts, though actual Madras specimens have not been examined.

Meriandra bengalensis, Benth., is the Bengal Sage, a pretty though straggling shrub with leaves like those of the cultivated sage (*Salvia officinalis*, Linn.) but strongly smelling of camphor. It is often cultivated and frequently found run wild. Its home is Abyssinia.

Family CXVI. PLANTAGINACEAE.

Scapigerous herbs. *Leaves* usually radical. *Flowers* small, greenish, spicate, often dimorphic, bracteate. *Sepals* 4, imbricate in bud, persistent. *Corolla* hypogynous, scarious, salver-shaped; lobes 4, short, imbricate in bud. *Stamens* 4, inserted on the corolla-tube; filaments capillary, persistent; anthers large, pendulous, versatile. *Ovary* superior, 1–4-celled; ovules 1 or more in each cell; style filiform with 2 lines of stigmatic hairs. *Fruit* a small membranous capsule, 1–4-celled, dehiscence circumscissile. *Seeds* usually peltate, attached by the centre; testa thin, mucilaginous; albumen fleshy; embryo cylindric, transverse; radicle inferior.

Plantago, Linn.

CHARACTERS OF THE FAMILY.

PLANTAGO ASIATICA, Linn., Wt. Ill. t. 177 *P. major*, Hook. f.; F.B.I. iv. 705 *in part.*

Nilgiri and Pulney Hills, at high levels, in waste places and by roadsides. Plantain.

A perennial herb with erect stout rootstock and radical leaves, these are ovate, entire or more usually coarsely dentate or lobed, 3–5-ribbed, long-petioled, the flowers in long spikes with rather large bracts, the capsules many-seeded. It differs somewhat from the common European weed *P. major*, Linn.

P. lanceolata, Linn., the Ribwort Plantain, is occasionally found in the Nilgiris, probably introduced, as suggested by Trimen for Ceylon, with British grass-seed.

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 VII

NYCTAGINACEAE TO *EUPHORBIACEAE*.

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

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INTRODUCTION TO PART VII

SINCE the issue of Part VI supplementary notes on Parts I, III, V and VI have appeared as No. V of "Notes on the Flora of Madras" in the 'Kew Bulletin' for 1924, p. 235.

It is with great regret that I have to record the death of Mr. J. S. Gamble on October 16th. Mr. Gamble had corrected all the proofs and had seen the final revises of all but the last two sheets through the press before his death.

ARTHUR W HILL.

ROYAL BOTANIC GARDENS, KEW;
November, 1925.

Made and printed in Great Britain.

FLORA OF MADRAS.

IV. MONOCHLAMYDEAE.

Sepals distinct, herbaceous, rarely petaloid, imbricate or valvate, or connate in a tube with imbricate or valvate lobes. *Petals* usually 0, very rarely 1-seriate and like the sepals, more rarely 1-seriate and truly coralline, inserted on the disk or adnate to the ovary. *Torus* small, or raised and stalk-like. *Stamens* few, rarely numerous, inserted on the torus or rarely on the base of the perianth. *Carpels* 1 or more, free or connate.

Family CXVII. NYCTAGINACEAE.

Herbs, shrubs or trees. *Leaves* usually opposite, entire; stipules 0. *Flowers* hermaphrodite, rarely unisexual, regular, sometimes dimorphous; inflorescence various, the flowers often involucrate. *Perianth* monophyllous, petaloid, usually small; tube persistent, campanulate funnel-shaped or salver-shaped, enveloping the fruit; limb 3–5-lobed, persistent or deciduous, the lobes plicate in bud. *Stamens* 1–30, hypogynous, sometimes unilateral: filaments usually unequal, inflexed in bud; anthers included or exserted, dorsifixed, didymous. *Ovary* free, 1-celled; style filiform, involute in bud; stigma small; ovule solitary, basal, erect. *Fruit* indehiscent, enclosed in the hardened perianth-tube. *Seed* erect; testa thin, adherent; albumen soft or floury; embryo curved or straight and with folded cotyledons; radicle inferior.

Erect or diffuse herbs; embryo hooked, the radicle long; limb of perianth funnel-shaped, 5-lobed on the margin, the lobes plicate; flowers paniculate or umbellate ..... 1. **Boerhaavia.**

Trees or shrubs, sometimes climbing; embryo straight, the radicle short; limb of perianth 5–10-lobed, of ♂ flower funnel-shaped, of ♀ tubular, lobes induplicate-valvate; flowers in corymbose cymes ..... 2. **Pisonia.**

1. Boerhaavia, Linn.

Erect or diffuse herbs, often divaricately branched. *Leaves* opposite, often in unequal pairs. *Flowers* small, in panicles umbels or heads, articulated with the pedicels; bracteoles small,

often deciduous, rarely involucrate. *Perianth*-tube long or short, ovoid below, narrowed above the ovary; limb funnel-shaped or campanulate, 5-lobed. *Stamens* 1–5, connate below around the ovary, exserted; filaments capillary, unequal; anthers didymous. *Ovary* oblique, stipitate; ovule erect; stigma peltate. *Fruit* small, enclosed in the ovoid turbinate or clavate, truncate, ribbed or angled, viscidly glandular perianth-tube. *Seed* with adherent testa; embryo hooked; cotyledons thin, broad, the outer the larger, enclosing the soft floury albumen; radicle long.

Fruit glandular on the ribs, not at the crown :—

Flowers sessile or very nearly so, in panicles of subcapitate umbels with lanceolate minute bracteoles; perianth very short, urceolate; fruit clavate, 5-ribbed, viscidly glandular :—

Leaves thick, in unequal pairs, ovate oblong or suborbicular, acute or obtuse, rounded or subcordate at base, glabrous above, white beneath, somewhat undulate on the margin, up to 2 in. long, 1·25 in. broad, petiole slender, up to 1 in. long, nerves 3–4 pairs ..... 1. *diffusa.*

Leaves coriaceous, in equal or unequal pairs, ovate or ovate-oblong, obtuse, rounded at base, scabrid on both surfaces, crispate-undulate on the margins, up to 1 in. long, ·75 in. broad, petiole up to ·25 in. long. nerves 5–6 pairs, prominent when dry 2. *crispa.*

Flowers on capillary pedicels in umbels with linear lanceolate bracteoles; perianth ·25 in. long with slender tube and funnel-shaped limb; fruit clavate with large glands; leaves thick, triangular-ovate, acute, rounded or cordate at base, glabrous above, pubescent beneath, repand sinuate, up to 3 in. long, 1·5 in. broad, petiole to ·5 in. ..... 3. *repanda.*

Fruit with large stalked globose glands on the crown, clavate; flowers in long-pedunculate racemes, in few-flowered whorls on a slender rhachis; pedicels filiform, perianth-tube slender, limb funnel-shaped; leaves thick, broadly ovate or suborbicular, obtuse, mucronate, cordate at base, glabrous, the margins sinuate, up to 2·25 in. long and broad, petiole to ·75 in. ..... 4. *verticillata.*

1. BOERHAAVIA DIFFUSA, Linn. *B. repens*, Linn.; F. B. I. iv. 709. *B. procumbens*, Roxb.; Wt. Ic. t. 874.

All plains Districts, also to some height in the hills, a weed of waste lands and road-sides.

A diffuse herb with stout rootstock and many erect or procumbent branches, the flowers red, the fruit very

viscid, easily detached and so adherent to clothes or the fur of animals. It is very variable according to soil and climate.

2. BOERHAAVIA CRISPA, Heyne in Wall. Cat. 6771; F. B. I. iv. 709.

Deccan, in dry Districts (Heyne).

A stout very scabrid herb, with long peduncles.

3. BOERHAAVIA REPANDA, Willd.; F. B. I. iv. 709; Wt. Ic. t. 1766.

Deccan, in dry Districts.

A diffuse herb with pink flowers, often found climbing among bushes, the fruit with conspicuous viscid glands.

4. BOERHAAVIA VERTICILLATA, Poir.; F. B. I. iv. 710. *B. stellata*, Wt. Ic. t. 875.

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

A diffuse herb with long branches, white flowers and a fruit with curious glands round the top.

2. Pisonia, Linn.

Trees or shrubs, unarmed or with axillary spines. *Leaves* opposite or alternate, entire. *Flowers* small, usually dioecious, in paniculate, subsessile or pedunculate cymes, bract and bracteoles small. *Male flowers*: perianth campanulate, the limb 5-lobed, the lobes induplicate-valvate; stamens 6–10, exserted, filaments connate below in a tube or ring, anthers oblong or didymous. *Female flowers*: perianth tubular, usually enlarged at base; ovary sessile, elongate, style included or exserted; stigma capitellate, peltate or fimbriate. *Fruit* enclosed in the coriaceous, oblong linear or clavate, perianth-base, compressed or 5-angled, usually with rows of viscid stipitate glands; utricle membranous. *Seed* with a hyaline testa adnate to the pericarp, embryo straight; albumen soft, enclosed in the cotyledons, radicle inferior.

PISONIA ACULEATA, Linn.; F. B. I. iv. 711; Wt. Ic. tt. 1763–64.

N. Circars, Ganjam to Godavari, on the Coast, in forest lands, hedges and bushes, common, less so southwards as at Striharikota. Occasionally found inland, as in Anamalais, at 1,200 ft. (Fischer)

A large thorny climbing shrub with opposite coriaceous elliptic or ovate leaves up to 3 in. long, the flowers in dense corymbose cymes, greenish-white. Wood of peculiar and interesting structure. The plant makes a good hedge, green or dry. Inland specimens are sometimes without thorns. Vern. *Ur.* Hati-ankusa.

P. morindifolia, R. Br.; Wt. Ic. t. 1765, is the Tree Lettuce, a small tree of the beach forests of the Andaman Islands, frequently found in gardens in Madras and other places near the sea on both coasts and noticeable for its very pale green leaves.

Mirabilis Jalapa, Linn., the Marvel of Peru, is a large herbaceous plant with showy flowers of various colours, crimson yellow white or striped, frequently grown in gardens and often seen run wild.

Bougainvillaea spectabilis, Willd., and *B. glabra*, Chois., are large thorny climbing Brazilian shrubs very common in gardens. They have small pale yellow flowers with large and conspicuous magenta or purple bracts. A variety (*B. lateritia*) has the bracts brick-red and the leaves nearly tomentose.

Family CXVIII. AMARANTACEAE.

Herbs, rarely shrubs, erect or climbing. *Leaves* opposite or alternate; stipules 0. *Flowers* usually hermaphrodite, rarely polygamous or dioecious, small, usually in terminal and axillary, simple or panicled, spikes cymes or clusters; bracts hyaline or scarious; bracteoles 2, scarious. *Perianth* dry, calycine, persistent, usually of 5 free or slightly connate hyaline or scarious imbricate segments. *Stamens* 1–5, opposite the perianth segments; filaments free or connate below in a membranous hypogynous cup, often alternating with membranous staminodes; anthers dorsifixed, 1- or 2-celled. *Ovary* 1-celled, ovoid ellipsoid or globose; ovules 1 or more, amphitropous, erect or suspended from basal funicles; style sometimes simple with capitellate stigma, sometimes 2–3-fid with acute stigmas or styles 2 or 3 papillosely stigmatic on the lower face. *Fruit* a membranous utricle, rarely a berry or a capsule, breaking irregularly or circumscissly. *Seed* erect or inverted, orbicular ovate or reniform, compressed; testa crustaceous; tegmen, if present, membranous; embryo horseshoe-shaped or annular, surrounding a floury albumen.

Anthers 2-celled :—
Leaves alternate :—
Seeds several, utricle circumscissile ..... 1. **Celosia.**
Seeds solitary, erect :—
Flowers hermaphrodite :—
Flowers panicled ; fruit an indehiscent utricle....2. **Banalia.**
Flowers capitate ; fruit a circumscissile utricle..3. **Allmania.**
Flowers spicate ; fruit indehiscent, crustaceous, rugose 4. **Digera.**
Flowers unisexual ; fruit an indehiscent or circumscissile utricle .....5. **Amarantus.**
Leaves opposite ; ovule and seed solitary, suspended from a basal funicle :—
Flowers clustered, 1–3 perfect surrounded by others imperfect with hooked bristles or awns :—
Stamens with interposed staminodes .....6. **Cyathula.**
Staminodes 0 .....7. **Pupalia.**
Flowers all perfect :—
Staminodes 0 :—
Perianth-segments ribbed ; stamens 5 :—
Flower-spikes axillary.....8. **Psilotrichum.**
Flower-spikes panicled ..... 9. **Psilostachys.**
Perianth-segments hyaline ; stamens 1 or 2 10. **Nothosaerva.**
Stamens with interposed staminodes; perianth-segments, bracts and bracteoles hardened, spinescent ..11. **Achyranthes.**
Leaves alternate or fascicled, or with opposite and alternate mixed; stamens with interposed staminodes.....12. **Aerva.**
Anthers 1-celled ; leaves opposite ; flowers in small clusters 13. **Alternanthera.**

1. **Celosia,** Linn.

Herbs, usually annual, the stems sometimes woody below. *Leaves* alternate. *Flowers* hermaphrodite, in terminal or axillary, often dense, often interrupted spikes, sessile or shortly pedicelled, white or coloured; bracts and bracteoles scarious, shining. *Perianth*-lobes 5, calycine, slightly connate below, scarious, oblong or lanceolate. *Stamens* 5; filaments slender, connate below in a membranous hypogynous cup; anthers 2-celled. *Ovary* 1-celled, ovoid or subglobose; ovules 2 or more on long funicles from the base of the ovary; style 0 or short or

long, sometimes elongating in fruit; stigma simple. *Fruit* a utricle dehiscing in circumscissile fashion near the middle, membranous or sometimes corky or coriaceous. *Seeds* 2 or more, erect, lenticular; testa crustaceous, black, often shining; embryo annular, surrounding the floury albumen; cotyledons linear.

Flowers in dense stout imbricate spikes 1–6 in. long, the perianth often pink at first, but becoming later shining white, its lobes about ·25 in. long; leaves variable, linear or linear-lanceolate, rarely ovate or lanceolate, sometimes reaching 6 in. long and 1·5 in. broad ..... 1. *argentea.*

Flowers in small clusters in slender interrupted spikes :—

Perianth-lobes ·1 in. long; utricle gradually narrowed at apex, with style and 2 recurved stigmas; leaves ovate or lanceolate, acuminate, narrowed at base, up to 3 in. long, 2 in. broad, petiole to 1·5 in. long ..... 2. *pulchella.*

Perianth-lobes about ·075 in. long; utricle with a thickened head at apex, the 2 stigmas short and slender, recurved; leaves ovate, obtuse or subacute, rounded at base, up to 1·5 in. long, 1 in. broad, petiole to ·75 in. ..... 3. *polygonoides.*

1. CELOSIA ARGENTEA, Linn.; F. B. I. iv. 714; Wt. Ic. t. 1767.

   All plains Districts, chiefly on cultivated land or among grasses, up to 4,000 ft. in the hills, common but not really indigenous.

   An erect glabrous annual up to 3 ft. high, the long shining flower-heads conspicuous.

2. CELOSIA PULCHELLA, Moq.; F. B. I. iv. 715; Wt. Ic. t. 1768.

   Deccan, Horsleykonda in Chittoor, 4,000 ft. (Gamble); W. Ghâts, Nilgiris, Pulneys and hills of Tinnevelly and Travancore, at 3,000–6,000 ft.

   A slender diffuse herb, the branches glabrous.

3. CELOSIA POLYGONOIDES, Retz.; F. B. I. iv. 715.

   Deccan and Carnatic, on sandy soils.

   A diffuse herb with many branches from a stout rootstock.

C. cristata, Linn., the Cockscomb plant, commonly cultivated in gardens and sometimes found as an escape, is easily recognized by the curious monstrous fasciated growth of its inflorescence, which may be red or yellow usually. It is very closely allied to *C. argentea*, and may be a variety of that species.

2. Banalia, Moq.

An erect glabrous branching herb. *Leaves* alternate, membranous. *Flowers* hermaphrodite, in clusters in axillary or terminal spikes, usually forming pale chaffy thyrsoid panicles; bracts hyaline, also the 2 bracteoles. *Perianth*-segments 5, calycine, oblong, scarious, membranous, 3-nerved. *Stamens* 5, the filaments united below in a cup; anthers 2-celled. *Ovary* ovoid, compressed; style erect; stigmas 2, recurved, papillose; ovule 1, pendulous on a slender funicle. *Fruit* a subglobose, indehiscent utricle. *Seed* orbicular, the testa black, crustaceous.

BANALIA THYRSIFLORA, Moq.; F. B. I. iv. 716; Wt. Ic. t. 1774.

W. Ghâts, from Wynaad southwards, at 2,000–6,000 ft.

A slender tall herb with conspicuous white or cream-coloured thyrsoid panicles; leaves rhomboid-ovate or ovate-lanceolate, acuminate, up to 4 in. long, 2 in. broad.

3. Allmania, R. Br.

Erect or diffuse herbs. *Leaves* alternate, entire. *Flowers* hermaphrodite; in small dichasia, usually of 3, the centre one sessile with 1 or no bracteoles, the side ones pedicellate with 1 bract and 2 bracteoles; these dichasia are collected in terminal or axillary globose or oblong heads; bracts and bracteoles narrow, scarious, usually hispid, with filiform tips. *Perianth* calycine, of 5 nearly free oblong lanceolate scarious lobes. *Stamens* 5, the filaments connate in a membranous hypogynous cup, anthers 2-celled. *Ovary* ovoid, narrowed in a straight style; ovule 1, erect; stigma 2-lobed. *Fruit* a subglobose or ovoid membranous utricle, circumscissly dehiscent. *Seed* erect, subglobose, in a cup-shaped arillus; testa black, shining, crustaceous; embryo annular, surrounding copious albumen; cotyledons linear; radicle inferior.

Flower-heads usually sessile, brown, globose; prostrate diffuse or rarely erect herbs with extremely variable leaves ..... 1. *nodiflora*.
Flower-heads more or less peduncled, white, oblong or ovoid, rarely globose; erect pale herbs with usually narrow spathulate leaves up to 5 in. long ..... 2. *longepedunculata*.

1. ALLMANIA NODIFLORA, R. Br.; F. B. I. iv. 716 (*var. Roxburghii*, Hook. f.).

Circars and Carnatic, in coast Districts.

A straggling many-branched herb with stout root-stock and obovate spathulate apiculate leaves, the flower-heads usually ·5 in. in diam. Closely allied and often difficult to distinguish are the following varieties, established in the 'F. B. I.'

Var. *procumbens*, Hook. f. *Chamissoa nodiflora*, Wt. Ic. t. 1770, prostrate with long prostrate branches, small, variable, linear to orbicular leaves and small flower-heads. Coast of the Carnatic, on sand.

Var. *aspera*, Hook. f. *Chamissoa aspera*, Wt. Ic. t. 1772, erect but diffuse and hispidly hairy, the leaves linear-oblong or lanceolate, the flower-heads larger, often ·75 in. in diam. Deccan Districts, west to the E. slopes of the Ghâts, less common in Circars or Carnatic, in fields.

Var. *dichotoma*, Hook. f. *Chamissoa dichotoma*, Moq.; Wt. Ic. t. 1771, erect dichotomous and nearly glabrous with elliptic or ovate apiculate leaves. Carnatic, from Salem and Nellore southwards.

Var. *angustifolia*, Hook. f. Erect, sometimes tall and slender, with linear or linear-oblong leaves often up to 3 in. long, and rather large sometimes peduncled flower-heads. N. Circars, Deccan, Carnatic and E. slopes of the W. Ghâts up to 6,000 ft.

2. ALLMANIA LONGEPEDUNCULATA, Gamble n. comb. *A. nodiflora*, R. Br., var. *longepedunculata*, Trimen. *A. albida*, R. Br.; F. B. I. iv. 717. *Chamissoa albida*, Wt. Ic. t. 1769.

Circars, Deccan and Carnatic, but chiefly near the coast.

A tall erect herbaceous plant with pale (even when dry) leaves and white flower-heads often with rather long peduncles.

4. Digera, Forsk.

An annual herb. *Leaves* alternate, entire, petioled. *Flowers* hermaphrodite, in axillary peduncled spikes, ternate, the 2 outer reduced to crested scales, the central perfect; bracts and bracteoles persistent. *Perianth* calycine, submembranous; segments 5, oblong, erect, the 2 outer larger. *Stamens* 5, hypogynous; filaments free, filiform; anthers 2-celled. *Ovary* 1-celled, compressed truncate; style filiform; stigmas 2, short, recurved.

Fruit **a subglobose**, crustaceous, rugose nut enclosed in the perianth. *Seed* **globose**, erect; testa thin, adhering to the albumen; **embryo annular**; cotyledons linear.

DIGERA ARVENSIS, Forsk.; F. B. I. iv. 717. *Desmochoeta muricata*, DC.; Wt. Ic. t. 732.

Deccan and Carnatic, a weed of roadsides and waste places. **A slender herb** with prostrate branches, the leaves variable, ovate **elliptic** or lanceolate, acute or obtuse, up to 3 in. long and **nearly 2 in.** broad, the petioles slender, often 1 in. long.

5. Amarantus, Linn.

Erect or decumbent annual herbs. *Leaves* alternate. *Flowers* small, **monoecious, in axillary** clusters or dense terminal thyrsoid panicles; **bracts** herbaceous, often persistent; bracteoles 2. *Perianth* **calycine**, of 2–5 membranous lobes, the ♂ usually ovate-**lanceolate, awned**, the ♀ oblong or obovate, usually mucronate **and often smaller**. *Stamens* 2–5, as many as the perianth-lobes; **filaments free**; anthers 2-celled. *Ovary* ovoid, compressed, 1-celled; **ovule solitary**, erect; styles short or 0; stigmas 2–3. *Fruit* **an orbicular** or ovoid compressed utricle, membranous and usually **circumscissile**, or coriaceous and indehiscent. *Seed* erect, orbicular, **compressed**; testa crustaceous; embryo annular, enclosing **the floury** albumen; cotyledons linear; radicle inferior.

Bracteoles **awned** or **setaceous**, equalling or exceeding the perianth-lobes; **utricle dehiscent**, circumscissile :—

Stamens **and perianth-lobes** 5 each :—

Leaf-axils with spines; leaves ovate or oblong, obtuse; **bracts bristle-tipped**; flower-clusters in dense or lax panicles, the **axils often with spines** ..... 1. *spinosus.*

Leaf-axils not spinous; leaves elliptic or ovate-lanceolate; **bracts acicular**; flowers in thyrses :—

Leaves acute or acuminate; bracts recurved, exceeding the **oblong-lanceolate** acuminate perianth-lobes .... 2. *paniculatus.*

Leaves obtuse, rarely acute; bracts hardly recurved, scarcely **exceeding the ovate** or obovate mucronate perianth-lobes 3. *caudatus.*

Stamens **and perianth-lobes** 3 each :—

Erect plants, the flowers clustered in lower axils and also gradually **joined in a long** terminal spiciform panicle; leaves large but **variable, long-petioled**; perianth-lobes awned :—

Stigmas short and straight; awns of perianth-lobes long and tapering; leaves ovate, acute, cuneate at base, up to 5 in. long, 3 in. broad, petiole to 3 in., sometimes lanceolate or linear-lanceolate .....4. *gangeticus.*

Stigmas long and feathery; awns of perianth-lobes short, shorter in ♂ than in ♀, but the ♂ flowers generally larger; leaves elliptic-lanceolate, acuminate, cuneate and decurrent at base, up to 6 in. long, 2 in. broad, petiole to 2 in...5. *Caturus.*

Diffuse, no terminal spike; stigmas short; awns of perianth-lobes short and abrupt; leaves ovate-elliptic or deltoid-ovate, emarginate, up to 1·5 in. long, 1 in. broad, the petiole to 1 in. 6. *mangostanus.*

Bracteoles acute or slightly awned, shorter than the perianth-lobes; utricle rugose; stamens and perianth-lobes 3 each :—

Utricle prominently rugose, indehiscent, acute; flowers in axillary and terminal panicled slender spikes; leaves ovate or deltoid, obtuse and often emarginate at apex, truncate or cuneate at base, up to 3 in. long, 2 in. broad, petiole to 2 in. .....7. *viridis.*

Utricle ovoid, slightly rugose or waved, usually circumscissile; flowers in axillary clusters; leaves obovate, obtuse, rarely retuse, usually mucronate, cuneate at base, dotted, up to 1 in. long, ·5 in. broad, petiole to ·5 in. .....8. *polygamus.*

1. AMARANTUS SPINOSUS, Linn.; F. B. I. iv. 718; Wt. Ic. t. 513.

All plains Districts, in waste places, fields and gardens and on roadsides; a common and troublesome weed.

An erect spinous herb with hard often reddish stems. The leaves are sometimes eaten as spinach. Vern. *Hind.* Kanta nutiya; *Tam.* Mulluk kirai.

2. AMARANTUS PANICULATUS, Linn.; F. B. I. iv. 718. *A. frumentaceus*, Buch.-Ham.; Wt. Ic. t. 720.

Deccan and other hilly regions, cultivated and run wild.

A tall annual herb grown for its seeds, which may be white red or black: the leaves give a good spinach though difficult to pick. Vern. *Tam.* Pungi kirai.

3. AMARANTUS CAUDATUS, Linn.; F. B. I. iv. 719.

Hills of Deccan and W. Ghâts, cultivated only, chiefly in gardens, perhaps also sometimes found run wild. Love-lies-bleeding.

A tall herb with long heavy drooping thyrses of crimson flowers.

4. AMARANTUS GANGETICUS, Linn.; F. B. I. iv. 719. *A. oleraceus*, Roxb.; Wt. Ic. t. 715.

Most plains Districts, cultivated and run wild.

An erect leafy herb, grown as a spinach (ság). Vern. *Hind.* Lal ság.

Var. *tristis*, Prain. *A. tristis*, Roxb.; Wt. Ic. t. 713.

Many branches from near the base and more frequently cut and used. Cultivated.

5. AMARANTUS CATURUS, Heyne: F. B. I. iv. 720.

Deccan, without locality (Heyne).

An erect well-marked plant with thin leaves and long very slender flower-spikes. The utricle may perhaps not be dehiscent circumscissly; it has an elongated neck and slender plumose styles.

6. AMARANTUS MANGOSTANUS, Linn.; F. B. I. iv. 720.

Deccan and Carnatic, in most Districts, a weed of roadsides and waste lands, not common.

A diffusely-branched slender herb.

7. AMARANTUS VIRIDIS, Linn.; F. B. I. iv. 720. *A. fasciatus*, Roxb.; Wt. Ic. t. 717. *Euxolus caudatus*, Moq.; Wt. Ic. t. 1773.

All plains Districts, a weed of waste places and cultivated land.

An erect glabrous annual, the leaves much used as spinach.

8. AMARANTUS POLYGAMUS, Linn.; F. B. I. iv. 721. *A. polygonoides*, Roxb.; Wt. Ic. tt. 512, 719.

All plains Districts, a common weed of waste or cultivated land.

A small annual usually prostrate herb, the leaves often collected and used as spinach.

6. Cyathula, Lour.

Herbs or undershrubs. *Leaves* opposite, petioled, entire. *Flowers* small, hermaphrodite, in large or small, bracteate and bracteolate, fascicles with 1–2 perfect flowers and others imperfect, the fascicles in heads, racemes or spikes. *Perianth* of perfect flowers calycine, scarious, 5-lobed, the lobes acuminate or with hooked awns; of imperfect flowers reduced to hooked rigid awns. *Stamens* 5, the filaments connate below in a

hypogynous membranous cup, with intervening lacerate or 2–3-fid staminodes; anthers 2-celled. *Ovary* obovoid, 1-celled; ovule solitary, pendulous from a long basal funicle; style simple, filiform; stigma capitellate. *Fruit* an ovoid membranous utricle enclosed in the perianth, its apex areolate. *Seed* oblong, inverse; testa coriaceous; embryo annular; cotyledons linear, flat; radicle erect.

CYATHULA PROSTRATA, Blume; F. B. I. iv. 722. *Desmochoeta prostrata*, DC.; Wt. Ic. t. 733.

Deccan, in Mysore and the Ceded Districts to Coimbatore, up to 3,000 ft.; W. Coast and W. Ghâts, S. Canara to Travancore, up to 3,000 ft.

A slender herb, prostrate below and rooting at the nodes, the branches ascending, ending in slender racemes of fascicles of pale violet flowers, the leaves rhomboid or ovate, subacute, up to 2·5 in. long, 1·5 in. broad.

7. Pupalia, Juss.

Herbs or undershrubs. *Leaves* opposite, entire, petioled. *Flowers* green, hermaphrodite, fascicled in clusters with 1–2 perfect flowers, the rest imperfect, the clusters rather distant in simple or panicled spikes; bracts and bracteoles scarious, awned. *Perianth* of perfect flowers calycine, of 5 nearly equal lanceolate acuminate 3–5-nerved lobes, of imperfect flowers reduced to stellately spreading hooked bristles. *Stamens* 5; filaments slender, subulate, shortly combined at the base; anthers 2-celled; staminodes 0. *Ovary* ovoid, 1-celled; ovule 1, pendulous from a long basal funicle; style simple; stigma capitate. *Fruit* an ovoid membranous utricle, enclosed in the perianth, the top areolate. *Seed* inverse, lenticular, rostellate; testa thinly crustaceous; tegmen membranous; embryo annular; cotyledons linear, flat; radicle ascending.

Leaves ovate or elliptic, up to 4 in. long:—

Herbaceous, glabrous or nearly so, annual or biennial; leaves ovate or elliptic-lanceolate, acuminate, up to 4 in. long, 2 in. broad, petioles to ·75 in.; hooked bristles purple ..... 1. *atropurpurea.*

Shrubby, tomentose, perennial; leaves elliptic or ovate, acute or obtuse, often shortly apiculate, base usually rounded, up to 4·5 in. long, 2 in. broad, petioles to ·5 in.; hooked bristles yellow

2. *lappacea*

Leaves orbicular or broadly obovate, retuse, thick, ·75–1·25 in. in diam., decurrent at base to a short petiole; hooked bristles brown **3. *orbiculata.***

1. PUPALIA ATROPURPUREA, Moq.; F. B. I. iv. 723. *Desmochaeta atropurpurea*, DC.; Wt. Ic. t. 731.

   N. Circars, common; Deccan, in Coimbatore and to the E. slopes of the Ghâts, less so.

   A slender herb with long branches, the flower-clusters with loose brownish wool.

2. PUPALIA LAPPACEA, Moq.; F. B. I. iv. 724.

   N. Circars, Deccan and Carnatic, westwards to the E. slopes of the Ghâts.

   A large straggling undershrub, the flower-clusters very white woolly.

Var. *velutina*, Hook. f. Densely nearly white-tomentose or velvety, the leaves smaller and usually orbicular—without locality (Wight).

3. PUPALIA ORBICULATA, Wt. Ic. t. 1783; F. B. I. iv. 724.

   Coromandel Coast, especially near Madras, a sand-binding plant (see H. Cleghorn in 'Madr. Journ.,' i.) of the sea beach.

   An extensively spreading prostrate plant from a stout woody rootstock, the hooked bristles finally becoming as it were pinnate, the wool loose and white.

8. Psilotrichum, Blume.

Herbs or undershrubs. *Leaves* opposite, entire, petioled. *Flowers* white or greenish, hermaphrodite, in axillary, solitary or panicled, spikes or clusters; bracts small, persistent; bracteoles 2, small. *Perianth* calycine, of 5 slightly connate segments, the outer gibbous below, the inner rather smaller. *Stamens* 5; filaments subulate, shortly connate at the base; anthers 2-celled; staminodes 0. *Ovary* oblong or subglobose; ovule 1, pendulous from a long basal funicle; style simple, slender; stigma capitellate or bifid. *Fruit* a globose or compressed utricle, enclosed in the hardened perianth. *Seed* inverse, lenticular; testa coriaceous or crustaceous; embryo annular, enclosing the floury albumen; cotyledons flat; radicle ascending.

Spikes few, in upper axils, ·5–1 in. long; perianth ·25 in. long, deeply grooved, pubescent; bracts lanceolate, bracteoles ovate, both awned;

leaves ovate-lanceolate, or lanceolate-acuminate, narrowed at base, **glabrous**, up to 3 in. long, 1 in. broad .....1. *nudum.*
Spikes many, in most axils under ·5 in. long; perianth ·15 in. long, **ribbed, with** silky wool; bracts ovate acuminate, bracteoles broadly **ovate, both** awned and villous; leaves ovate or elliptic, acute, rounded **at base, glabrous** or pubescent to even tomentose, up to 1·5 in. long, **nearly 1** in. broad.....2. *calceolatum.*
Spikes 1–3 together, terminal, ·5–·75 in. long; perianth ·15 in. long, **smoothly** pubescent, not ribbed, segments mucronate; bracts ovate, **mucronate**, villous, bracteoles ovate, awned, glabrous; leaves ovate-**lanceolate**, acute, narrowed at base, scaberulous-villous, 1–1·5 in. long, ·5–·75 in. broad .....3. *scleranthum.*

1. PSILOTRICHUM NUDUM, Moq.; F. B. I. iv. 724.
   Carnatic, chiefly South, about Courtallum (Wight).
   A many-branched undershrub.
2. PSILOTRICHUM CALCEOLATUM, Moq.; F. B. I. iv. 725. *P. nudum*, Wt. Ic. t. 1775.
   Deccan and Carnatic, especially on W. side from Coimbatore to Tinnevelly, in hill forests at low levels.
   An erect or somewhat climbing undershrub, with many branches.
3. PSILOTRICHUM SCLERANTHUM, Thw.; F. B. I. iv. 725.
   Travancore (Wight in 'Hb. Edinb.').
   A small undershrub with whitish flowers, a Ceylon plant.

9. Psilostachys, Hochst.

Slender dichotomous herbs. *Leaves* opposite, petioled. *Flowers* minute, hermaphrodite, in slender spikes, trichotomous at the ends of the filiform branches of a lax panicle. *Perianth* calycine, 5-partite, the 2 or 3 outer lobes strongly 3-nerved, broader than the inner. *Stamens* 5, free; anthers 2-celled; staminodes 0. *Ovary* subglobose or ovoid, 1-celled; ovule solitary; styles slender; stigma capitellate. *Fruit* an indehiscent membranous utricle. *Seed* inverse; testa coriaceous; embryo hooked; cotyledons linear, broader than the ascending radicle.

PSILOSTACHYS SERICEA, Hook. f.; F. B. I. iv. 726. *Achyranthes sericea*, Koenig; Wt. Ic. t. 726.
Locality unknown (Koenig); Coromandel Coast, at Coconada (Gamble), at Kistnapatam, Nellore (Fischer), on the sea coast.

A very pretty slender erect silky herb with broadly ovate leaves up to 1 in. long, ·75 in. broad. Bombay (Kathiawar) specimens seem to be more silvery silky than the E. coast ones.

10. Nothosaerva, Wight.

An annual herb with opposite spreading branches. *Leaves* opposite. *Flowers* very minute, woolly, hermaphrodite, in axillary, solitary or clustered spikes; bracts hyaline, persistent. bracteoles 2 hyaline. *Perianth* calycine, of 3–5 lobes, the lobes hyaline, obtuse, 1-nerved. *Stamens* usually 2, free; anthers 2-celled; staminodes 0. *Ovary* oblong, compressed; ovule solitary, pendulous from a long funicle; style short; stigma capitellate. *Fruit* a membranous oblong compressed utricle, enclosed in the perianth. *Seed* inverse, lenticular; testa crustaceous; embryo hooked, surrounding floury albumen; cotyledons linear; radicle superior.

NOTHOSAERVA BRACHIATA, Wt. Ic. t. 1776 bis (next No. 1921); F. B. I. iv. 726. *Pseudanthus brachiatus*, Wt. Ic. t. 1776 (*excl. analysis*).

Deccan and Carnatic, in most Districts.

An erect slender herb with very minute white flowers in fascicles of short close spikes, and membranous, ovate elliptic or lanceolate, leaves, usually acute, narrowed at base, up to 1·5 in. long.

11. Achyranthes, Linn.

Herbs, sometimes woody below. *Leaves* opposite, entire, petioled. *Flowers* hermaphrodite, in slender simple and panicled spikes, soon deflexed; bracts membranous, spinescent, persistent; bracteoles 2, spinescent. *Perianth* calycine, of 4–5 rigid, lanceolate, aristate segments somewhat connate below, ultimately ribbed and hardened. *Stamens* 2–5; filaments filiform, connate at the membranous base and alternating with as many quadrate staminodes which are toothed lacerate or with a toothed scale at the back; anthers 2-celled. *Ovary* oblong, subcompressed, 1-celled; ovule solitary, pendulous from a long basal funicle; style filiform; stigma capitellate. *Fruit* an oblong or ovoid utricle, rounded or areolate at apex, when ripe usually disarticulating above the bract. *Seed* inverse, oblong; testa coriaceous tegmen membranous; embryo annular, surrounding the floury albumen; cotyledons oblong, again incurved; radicle erect.

Aquatic plant; perianth in fruit much hardened, ·3 in. long, the outer segment longer than the rest; bracteoles orbicular; staminodes with a fimbriate dorsal appendage; leaves elliptic-lanceolate, acuminate, pubescent, up to 6 in. long, 1 in. broad ..... 1. *aquatica.*

Dry ground plants; perianth in fruit somewhat hardened, under ·25 in. long, the segments subequal; bracteoles spinous with hyaline wings:—

Wings of the bracteoles broad, nearly half as long as the spine; staminodes truncate, fimbriate, with or without dorsal appendages; leaves very variable ..... 2. *aspera.*

Wings of the bracteoles merely auricles at the base; staminodes truncate, toothed but not fimbriate; leaves variable, elliptic lanceolate or linear, membranous, glabrous or pubescent ....3. *bidentata.*

1. ACHYRANTHES AQUATICA, R. Br.; F. B. I. iv. 730. *Centrostachys aquatica*, Wall.; Wt. Ic. t. 1780.

   N. Circars, on the margins of rivers and ponds in Ganjam.

   A tall rather fleshy water plant, rooting in mud, the stems thick and angular, the spikes sometimes reaching 18 in. long.

2. ACHYRANTHES ASPERA, Linn.; F. B. I. IV. 730; Wt. Ic. t. 1777.

   All plains Districts, on roadsides and in waste places.

   An erect herb reaching 3 ft. in height, with velvety tomentose, orbicular obovate or elliptic, usually obtuse, thick leaves, reaching 4 in. long, 3 in. broad, the slender spikes often reaching 18 in. in fruit, the disarticulating fruit easily adhering to animals or clothing, as in the other species, and so being carried away to be sown elsewhere.

Var. *rubro-fusca*, Hook. f. *A. rubro-fusca*, Wt. Ic. t. 1778. Leaves elliptic-ovate, acute, brown when dry, reddish, with the stems, when fresh. Nilgiri Hills.

Var. *porphyristachya*, Hook. f. Leaves elliptic, acuminate, glabrous or pubescent, membranous, the spikes slender and elongate, the perianth quite ·25 in. long, the staminodes with appendages tufted at the back. Nilgiri and Pulney Hills.

3. ACHYRANTHES BIDENTATA, Blume; F. B. I iv. 730; Wt. Ic. t. 1779.

   W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Malabar, also Bababudan Hills of Mysore, above 4,000 ft.

An erect herb, the leaves very variable, passing from ovate-

lanceolate acuminate, pubescent, about 2 in. long, to lanceolate and finally linear, in some cases up to 8 in. long, 1·5 in. broad and nearly or quite glabrous.

12. Aerva, Forsk.

Herbs or undershrubs, erect prostrate or climbing. *Leaves* alternate or opposite or fascicled. *Flowers* hermaphrodite or polygamous, small or minute, in simple or panicled spikes; bracts and 2 bracteoles small. *Perianth* calycine, membranous, 5- rarely 4-lobed, the lobes equal or the outer wider, all or the inner only woolly. *Stamens* 5, rarely 4; filaments subulate, connate with interposed linear staminodes in a hypogynous cup; anthers 2-celled. *Ovary* ovoid or subglobose, 1-celled; ovule pendulous from a long basal funicle; style simple; stigma capitellate or 2-fid. *Fruit* a membranous utricle or a circumscissile capsule with coriaceous apex. *Seed* inverse; testa coriaceous; embryo annular, surrounding the floury albumen; cotyledons linear; radicle superior.

Perianth-lobes 5 :—

Spikes axillary or in terminal panicles; leaves opposite or alternate.

Erect; leaves alternate, linear oblong or spathulate, obtuse or acute, densely tomentose, up to 2·5 in. long, about ·5 in. broad; flowers dioecious, in densely white-woolly spikes 1–6 in. long forming leafless terminal panicles; stigmas 2, as long as the style 1. *tomentosa.*

Climbing: leaves alternate and opposite, elliptic-ovate or lanceolate, acute, mucronate, pubescent, up to 4 in. long, 2 in. broad; flowers hermaphrodite, in ovoid or cylindric white-woolly spikes ·25–1 in. long, and often in pairs, forming a lax panicle; stigmas very short, capitate.....2. *scandens.*

Spikes all axillary; leaves alternate :—

Erect or prostrate; leaves elliptic obovate or orbicular, obtuse or acute, pubescent above and white-woolly beneath, up to 1 in. long; flowers hermaphrodite or bisexual, minute, in small dense greenish-white heads or spikes, under ·5 in. long, often clustered; stigmas 2 .....3. *lanata.*

Bushy, prostrate below, then ascending; leaves orbicular or obovate, obtuse, thick, pubescent above, densely white- or slightly tawny-tomentose beneath, up to 2 in. long, 1·5 in. broad; flowers hermaphrodite, small, in small dense yellowish-white spikes ·25 in. long, clustered; stigmas 2, short.....4. *Wightii.*

Perianth-lobes 4; spikes cylindrical, peduncled, ·5–1 in. long, at the ends of short lateral branches, the flowers bisexual; leaves narrowly linear, opposite or fascicled at the nodes of the branchlets, ·25–·75 in. long; utricle circumscissile .....5. *Monsoniae.*

1. AERVA TOMENTOSA, Forsk. *Ae. javanica*, Wt. Ic. t. 876; F. B. I. iv. 727.

   Deccan and Carnatic, common.

   A very white tomentose conspicuous undershrub. The male flowers seem to be very rare indeed. Perianth-lobes obtuse.

2. AERVA SCANDENS, Wall.; F. B. I. iv. 727; Wt. Ic. t. 724 (*exc. utricle and seed*).

   N. Circars, Ganjam to Godavari, up to 5,000 ft.; Bababudan Hills of Mysore, at 4,000 ft., on waste land and climbing among bushes.

   A straggling undershrub with long branches and silvery-white flower-spikes. Perianth-lobes acuminate.

3. AERVA LANATA, Juss.; F. B. I. iv. 728; Wt. Ic. t. 723 (*not good*). *A. floribunda*, Wt. Ic. t. 1776 (analysis only), t. 1776 bis A (next t. 1921.)

   All plains Districts, and up to about 3,000 ft. in the Hills.

   A many-branched undershrub with small flower-spikes and leaves.

4. AERVA WIGHTII, Hook. f.; F. B. I. iv. 728.

   W. Ghâts, hills about Courtallum and Naterikal, in Tinnevelly (Wight, Hb. Madr.)

   A many-branched bushy undershrub from a stout root-stock, the leaves thick, the perianth-lobes acuminate and aristate.

5. AERVA MONSONIAE, Mart.; F. B. I. iv. 728; Wt. Ic. t. 725.

   Deccan and Carnatic, in dry sandy places, both near the Coast and inland, common.

   A rather conspicuous and striking plant with a long tap-root, many prostrate or ascending branches and pale pink spikes of crowded flowers reaching up to 1 to 1·5 in. in length.

13. Alternanthera, Forsk.

Herbs, usually prostrate. *Leaves* opposite. *Flowers* hermaphrodite, small, white, in axillary often clustered heads, bract

and 2 bracteoles scarious. *Perianth* calycine, segments 5, unequal, the 2 lateral innermost, concave. *Stamens* 2–5; filaments short, connate in a short cup, with or without intervening staminodes; anthers 1-celled. *Ovary* orbicular or ovoid; ovule solitary, pendulous from a long basal funicle; style short; stigma capitellate. *Fruit* a compressed, ovoid orbicular or obcordate, utricle, the margins thickened or winged. *Seed* inverse, lenticular; testa crustaceous; embryo annular, surrounding the floury albumen; cotyledons narrow; radicle superior.

ALTERNANTHERA TRIANDRA, Lamk. *A. sessilis*, R. Br.; F. B. I. iv. 731; Wt. Ic. t. 727.

All Districts, in wet places, both in the plains and in the hills to over 7,000 ft. It may be found in salt or brackish water as in fresh (Alcock in Ganjam, also Hooper).

A prostrate herb with lanceolate oblanceolate or linear-oblong leaves ·5–2 in. long, small white flowers in axillary clusters, 3 stamens and a broadly obcordate utricle.

Gomphrena globosa, Linn.; F. B. I. iv. 732; Wt. Ic. t. 1784, is the Globe Amaranth, a tall branched annual with large globose yellowish white or crimson heads of flowers, largely grown in gardens and often found as an escape. It probably came from America. Another species, provisionally identified as *G. decumbens*. Jacq. of Central America, is found on roadsides about Madras and is reported to be spreading rapidly. *Telanthera ficoidea*, Moq., is a small S. American prostrate plant resembling *Alternanthera* and used in garden-borders as its leaves turn a crimson colour. It is commonly called *Alternanthera amabilis*.

Family CXIX. CHENOPODIACEAE.

Herbs or shrubs, sometimes mealy, sometimes fleshy. *Leaves* usually alternate, simple, exstipulate. *Flowers* small, usually green, hermaphrodite or unisexual, usually regular, often dimorphic; bracts 1 or 0; bracteoles 0 or 2. *Perianth* simple, calycine, of 3–5 simple or connate segments, imbricate in bud. *Stamens* usually 5, opposite the perianth-segments, perigynous or hypogynous, free or connate at the base; anthers 2-celled, *Ovary* ovoid globose or depressed, 1-celled; ovule solitary, basal or lateral, campylotropous; style terminal; stigma capitate

2–3- lobed or stigmas 2–5 free or slightly united. *Fruit* a small utricle, rarely a circumscissile capsule, enclosed in the enlarged sometimes fleshy perianth. *Seed* horizontal or vertical with crustaceous coriaceous or membranous testa; albumen floury, fleshy or 0; embryo curved, annular or spiral.

Stems not twining; bracteoles free from the perianth; anthers erect or incurved in bud :—

Embryo annular or horse-shoe-shaped :—

Stems leafy, not jointed :—

Fruiting perianth not winged; albumen copious :—

Flowers all similar, usually hermaphrodite..1. **Chenopodium.**

Flowers dimorphic, the ♂ ebracteolate with 3–5 perianth-segments, the ♀ 2-bracteolate without perianth

2. **Atriplex.**

Fruiting perianth with transverse wings; albumen scanty

3. **Kochia.**

Stems jointed, fleshy; leaves 0 :—

Flowers in the scales of cone-like spikes; albumen fleshy

4. **Arthrocnemum.**

Flowers in cavities of successive joints; albumen 0

5. **Salicornia.**

Embryo spiral, albumen 0 :—

Perianth-segments not winged .....6. **Suaeda.**

Perianth-segments transversely winged .....7. **Haloxylon.**

Stems twining; bracteoles 2, adnate to the face of the perianth; anthers versatile; embryo spiral.....8. **Basella.**

1. Chenopodium, Linn.

Erect or prostrate herbs. *Leaves* alternate, entire, lobed or toothed. *Flowers* minute, hermaphrodite, in axillary clusters or cymes; bracts and bracteoles none. *Perianth* usually 5-lobed, the lobes concave, incurved. *Stamens* 5 or fewer, hypogynous or almost perigynous; anthers 2-celled. *Disk* 0 or annular. *Ovary* depressed-globose, rarely ovoid, ovule solitary, subsessile; stigmas 2–5, sometimes united below in a style. *Fruit* a membranous utricle, enclosed in the perianth. *Seed* usually horizontal; testa crustaceous or coriaceous; embryo nearly or quite annular, surrounding the floury albumen.

An erect scentless herb, green or grey with white granular mealiness; the stems usually striped green or purple; flowers in clusters in

panicled spikes; stigmas 2; seeds smooth, shining, somewhat keeled; leaves rhomboid deltoid or lanceolate, entire or lobed.....1. *album.*
A low rather foetid herb, green or with slight granular mealiness; the stems green; flowers in axillary spikes in spreading cymes; stigmas 2; seeds smooth, dull, sharply keeled; leaves rhomboid or deltoid ovate, sharply toothed .....2. *murale.*
A tall strongly aromatic glandular herb, pale green; the stems striate, glandular-pubescent; flowers in slender, axillary or terminal, simple or panicled spikes; stigmas 5; seeds smooth, the margins rounded; leaves oblong-lanceolate, sinuate-dentate, the upper entire
3. *ambrosioides.*

1. CHENOPODIUM ALBUM, Linn.; F. B. I. v. 3.
Most plains Districts, also in the Hills, a weed of roadsides, waste lands and cultivated ground. White Goosefoot.
A tall herb sometimes reaching 10 ft., clammy to the touch.

2 CHENOPODIUM MURALE, Linn.; F. B. I. v. 4.
Deccan, in Mysore and Coimbatore, probably an introduced weed, but not common.
A low herb, up to about 15 in. high.

3. CHENOPODIUM AMBROSIOIDES, Linn.; F. B. I. v. 4; Wt. Ic. t. 1786.
Deccan and W. Ghâts, up to 7,000 ft., in waste places and on cultivated land, probably not indigenous.
A tall aromatic often gregarious herb with very slender flowering spikes.

2. Atriplex, Linn.

Herbs or shrubs, usually mealy. *Leaves* alternate, rarely opposite. *Flowers* small, monoecious or dioecious, in axillary sessile clusters or in simple or panicled spikes; bracts 0, bracteoles in ♂ flowers 0, in ♀ 2, flat, accrescent, dilated in fruit and forming a 2 valved covering to it. *Perianth* in ♂ flower 3-5-partite, calycine, the lobes oblong or obovate, obtuse, in ♀ flowers 0. *Stamens* 3-5, inserted at the base of the perianth; filaments free or connate below; anthers didymous. *Ovary* ovoid or depressed-globose; ovule oblique or vertical; stigmas 2, subulate or filiform, connate below. *Fruit* a membranous utricle, rarely adnate to the seed, enclosed in the enlarged bracteoles.

Seed erect or inverted, suspended from a long funicle or rarely horizontal; embryo annular, surrounding the floury albumen.

ATRIPLEX REPENS, Roth; F. B. I. v. 7. *Obione Koenigii*, Moq.; Wt. Ic. t. 1790.

E. Coast, from Nellore southwards, on sandy sea-shores.

An undershrub with thick rootstock and long procumbent branches rooting at the nodes, the leaves small, ovate or ovate-oblong, rounded at apex, entire, completely covered with minute white shining scales, up to ·75 in. long; bracteoles in fruit thick and usually with warty protuberances on the back.

A. hortensis, Linn.; F. B. I. v. 6. *A. heterantha*, Wt. Ic. t. 1787, is a stout annual often tinged with red, the leaves ovate-lanceolate, the fruiting bracteoles orbicular and reticulate. It is sometimes cultivated as a spinach.

3. Kochia, Roth.

Herbs or undershrubs, usually villous or pubescent. *Leaves* alternate, sessile, narrow, entire. *Flowers* minute, axillary, solitary or in clusters, hermaphrodite and ♀, rarely only ♂; bracts 0. *Perianth* subglobose; lobes 5, incurved, closing over the utricle, girt by 5 free or confluent wings. *Stamens* 5, usually exserted; anthers ovate. *Ovary* depressed-globose; style slender; stigmas 2 or 3, capillary. *Fruit* a membranous depressed utricle. *Seed* ovoid or orbicular, horizontal; testa membranous; embryo annular, the albumen scanty.

KOCHIA INDICA, Wt. Ic. t. 1791; F. B. I. v. 11.

Deccan, in Coimbatore, on salt soils (Wight).

A tall erect branching annual, the small leaves linear-lanceolate, the flowers in much soft brown wool especially round the perianth with its ovate scarious wings.

4. Arthrocnemum, Moq.

Fleshy jointed branching shrubs or herbs. *Leaves* 0. *Flowers* very small, hermaphrodite or monoecious (?) in cylindric cone-like spikes, in clusters of 3 sunk in the hollows of the joints. *Perianth* calycine, usually 3–4-gonous, minutely toothed at apex, at length spongy. *Stamens* 1–3 (rarely seen, *cf.* Roxb.). *Ovary* ovoid; ovule 1 suspended on a basal funicle; style short; stigmas 2, subulate. *Fruit* an ovoid utricle, membranous or

crustaceous; enclosed in the spongy perianth. *Seed* vertical, ovoid; testa membranous; embryo comma-shaped, partly enclosing the albumen, cotyledons very small, radicle inferior.

Stems prostrate, the branches erect, stout; fruiting spikes ·2–·25 in. in diam., ·5–1·5 in. long; utricle crustaceous .....1. *indicum.*
Stems erect, the branches ascending, slender; fruiting spikes ·1–·15 in. in diam., ·5–1 in. long; utricle membranous....2. *fruticosum.*

1. ARTHROCNEMUM INDICUM, Moq.; F. B. I. v. 12. *Salicornica indica*, Willd.; Wt. Ic. t. 737.
   E. and W. Coasts, in salt marshes.
   A prostrate glaucous-green fleshy undershrub with numerous branches.

2. ARTHROCNEMUM FRUTICOSUM, Moq.
   Var. *glaucum*, Moq. *A. ? glaucum*, Ung. Sternb.; F. B. I. v. 12.
   E. Coast, from Madras (at Sadras, Lawson) to Tuticorin (Wight), in salt marshes.
   A tall erect many-branched shrub.

5. Salicornia, Linn.

Fleshy, jointed, branched shrubs or herbs. *Leaves* 0. *Flowers* minute, hermaphrodite, ternate, in the axils of scaly bracts sunk in superposed and decussately opposite cavities of the internodes, forming cylindric spikes; bracteoles 2 *Perianth* calycine, obpyramidal. *Stamen* 1, anther oblong. *Ovary* ovoid, narrowed to the tip; ovule sessile; stigmas 2, subulate. *Fruit* an ovoid membranous utricle, enclosed in the spongy perianth. *Seed* erect, compressed; testa hispid; albumen 0; embryo conduplicate; radicle inferior, parallel to the cotyledons.

SALICORNIA BRACHIATA, Roxb.; F. B. I. v. 12; Wt. Ic. t. 738.
E. Coast, Chilka Lake in Ganjam, Coasts of Nellore, Chingleput, Tanjore and Tinnevelly, in salt marshes.
An erect undershrub, the joints of the branches longer than in those of *Arthrocnemum* and resembling those of some species of *Viscum*. The flower-spikes are very slender.

6. Suaeda, Forsk.

Herbs or shrubs *Leaves* fleshy, terete, rarely flattish. *Flowers* minute, axillary, usually hermaphrodite, rarely bisexual, bracteate and 2-bracteolate. *Perianth* short, calycine, globose or urceolate, 5-lobed or 5-partite, the lobes equal or unequal,

incurved. *Stamens* 5; filaments short; anthers rather large. *Disk* large or 0. *Ovary* ovoid or orbicular, sessile, adnate below to the perianth, rounded or truncate at the apex; ovule solitary, subsessile; style 0; stigmas subulate, papillose. *Fruit* a small membranous or spongy utricle included in the perianth. *Seed* erect, horizontal or oblique; testa coriaceous or crustaceous; albumen 0 or scanty; embryo slender, plano-spiral.

Perennial; seed usually erect :—

Flowers hermaphrodite, in dense globose clusters forming long spikes, leafless above; stigmas 3; bracteoles with pectinate margins; leaves semiterete, oblong or ellipsoid or linear-obovate, up to ·5 in. long, ·2 in broad ..... 1. *nudiflora.*

Flowers polygamous, in axillary clusters; stigmas 2–5; bracteoles with entire margins; leaves linear, obtuse or subacute, up to 1 in. long, ·15 in broad ..... 2. *monoica.*

Annual; seed usually horizontal; flowers hermaphrodite, in small few-flowered clusters in lax elongate spikes; stigmas 3; bracteoles membranous, entire; leaves narrowly linear, semi-terete, up to 1 in. long, scarcely ·1 in. broad ..... 3. *maritima.*

1. SUAEDA NUDIFLORA, Moq.; F. B. I. v. 14. *S. indica*, Moq.; Wt. Ic. t. 1796.

   E. Coast, from the Chilka Lake southwards, on the sea coast, common.

   A woody undershrub with many branches densely covered with flowers.

2. SUAEDA MONOICA, Forsk.; F. B. I. v. 13; Wt. Ic. t. 1792.

   E. Coast, from the Kistna river southwards, on the sea coast.

   A small erect bush, with many branches.

3. SUAEDA MARITIMA, Dumort.; F. B. I. v. 14; *Chenopodina indica*, Wt. Ic. t. 1793.

   E. Coast from Madras southwards, on the sea coast, often near salt pans.

   An erect slender annual.

7. Haloxylon, Bunge.

Shrubs or small trees with opposite jointed branches. *Leaves* opposite, triangular and short or elongate and terete. *Flowers* hermaphrodite; solitary or opposite or 1–3 together in spikes in the axils of ovate bracts; bracteoles 2. *Perianth* calycine,

5-lobed, the lobes concave, accrescent, horizontally winged on the back. *Stamens* 5 or fewer, on the margin or base of a cupular disk with alternating lobes (? staminodes); filaments linear; anthers ellipsoid or hastate. *Fruit* a subglobose or depressed utricle, enclosed in the perianth; stigma 2-lobed or stigmas 3-4, recurved. *Seed* horizontal; testa membranous; albumen 0; embryo green, plano-spiral.

HALOXYLON RECURVUM, Bunge; F. B. I. v. 15. *Caroxylon indicum*, Wt. Ic. t. 1794.

Deccan, in Coimbatore (Wight).

A tall bushy plant reaching 3-4 ft. high, turning black when dry, the leaves small, fleshy, ovate, glabrous, the flowers rather large and with conspicuous wings to the perianth-lobes.

8. Basella, Linn.

Much branched twining fleshy herbs. *Leaves* alternate, entire. *Flowers* hermaphrodite, sessile, spicate; bracts minute, caducous, bracteoles 2, united in a 2-lipped cup, adnate to the perianth. *Perianth* calycine, fleshy, 5-lobed; lobes short, incurved, later accrescent and berry-like. *Stamens* 5, on the mouth of the perianth-tube; filaments short, erect in bud; anthers versatile. *Ovary* globose; ovule subsessile; styles 3; stigmas linear-clavate, papillose within. *Fruit* a globose utricle, enclosed in the fleshy perianth; pericarp thin, adnate to the seed. *Seed* erect, subglobose; testa crustaceous; albumen scanty; embryo plano-spiral, the cotyledons large, thin, convolute.

BASELLA RUBRA, Linn.; F. B. I. v. 20. *B. alba*, Linn.; Wt. Ic. t. 896.

All Districts, wild or cultivated. Indian Spinach.

A glabrous succulent climbing herb with small white or red flowers in spikes, the peduncles often becoming thickened. Leaves broadly ovate, acute or acuminate, often cordate at base, up to 5 in. long, 3 in. broad. It is a useful vegetable and makes a good spinach. Vern. *Hind.* Poi; *Tel.* Batsalla.

Beta vulgaris, Linn., the Beet, and *Spinacia oleracea*, Linn., the Spinach, are vegetables commonly cultivated in gardens. The S. American *Boussingaultia baselloides*, H. B. & K., is an ornamental climber with white fragrant flowers, grown in Madras Gardens.

Family CXX. POLYGONACEAE.

Herbs, rarely shrubs, very rarely trees, sometimes climbing. *Leaves* alternate, rarely opposite, entire or serrulate; stipules (ocreae) scarious or membranous, usually sheathing the stem. *Flowers* hermaphrodite, rarely polygamous, regular, solitary or in small bracteate clusters; pedicels usually articulate. *Perianth* simple, calycine or corolline, inferior; segments 3–6, free or connate, imbricate in bud. *Stamens* 5–8, rarely more or fewer, opposite the perianth-segments. *Disk* annular, glandular, or 0. *Ovary* free, sessile, 1-celled; ovule solitary, orthotropous, sessile or on a distinct funicle; styles 3 or 2, rarely 4; stigma capitate peltate or fimbriate. *Fruit* a small hard, usually trigonous or biconvex, nutlet, enclosed in the perianth. *Seed* erect; testa membranous; albumen floury, sometimes ruminate; embryo various; radicle superior.

Perianth 3–5-cleft; stigmas capitellate; fruit a compressed or trigonous nutlet.....1. **Polygonum.**
Perianth 6-cleft; stigmas fimbriate; fruit a triquetrous nutlet
2. **Rumex.**

1. Polygonum, Linn.

Herbs or shrubs, rarely climbing. *Leaves* alternate, entire, rarely lobed; stipules membranous, connate in a tubular ocrea. *Flowers* hermaphrodite, small or minute, axillary or terminal, the clusters sessile or in spiciform capitate or panicled racemes; pedicels short, usually jointed under the perianth; bracts and bracteoles membranous, ocreate. *Perianth* green or coloured, 4–5- rarely 3-cleft, the 2 outer segments usually smallest. *Stamens* 5–8, rarely 1–4, perigynous; filaments filiform, often dilated at base or alternate with the lobes of an annular or glandular disk. *Ovary* compressed or trigonous; styles 2 or 3, free or slightly connate; stigmas usually capitellate. *Fruit* a compressed or trigonous nutlet, more or less included in the persistent perianth; pericarp usually hard and often shining. *Seed* albuminous, embryo lateral or excentric; radicle long, cotyledons small.

Flowers in axillary clusters; ocreae tubular, hyaline, lacerate; leaves small, under 1 in. long, usually oblong obovate or linear..1. *plebejum.*
Inflorescence terminal :—

Inflorescence of sessile or pedicellate flowers in branched spikes or racemes :—

Nutlets biconvex :—

Bracts hispid and ciliate ; ocreae ·5–1 in. long, tubular, villous and strigose, truncate at mouth and rigidly bristle-ciliate ; racemes 1·5–3 in. long, paniculate ; leaves lanceolate, acuminate, silky pubescent, up to 8 in. long, 2 in. broad
2. *tomentosum.*

Bracts small, acute, with long cottony hairs, minutely ciliate on the margins ; ocreae up to 1 in. long, tubular, sparsely cottony, truncate at mouth ; racemes 1–2 in. long, paniculate, cottony ; leaves narrowly lanceolate, acuminate, densely white-cottony beneath, with prominent short nerves, up to 5 or more in. long. ..... 3. *lanigerum.*

Bracts glabrous, ciliate or not :—

Bracts not ciliate on the margins ; ocreae ·75–1·5 in. long, tubular, glabrous, truncate at mouth, closely embracing the stem till they get torn ; racemes slender, 2–4 in. long, paniculate ; leaves linear-lanceolate, long acuminate, usually glabrous and gland-dotted, up to 9 in. long, 1·25 in. broad ..... 4. *glabrum.*

Bracts stiff-ciliate on the margins ; ocreae ·25–·5 in. long, tubular, sparsely long strigose-hairy and ciliate ; racemes few, ·5–1 in. long, in panicles ; leaves linear- or oblong-lanceolate, glabrous except the strigose midrib beneath, up to 2 in. long, ·25 in. broad ..... 5. *minus.*

Nutlets trigonous, sometimes also biconvex on the same plant :—

Racemes stout ; bracts closely imbricate, nearly glabrous but short-ciliate on the margins ; ocreae ·5–1 in. long, tubular, strigose, with very long ciliae at the mouth ; leaves lanceolate or linear-lanceolate, acuminate, tapering at base, glabrous except the margins and midrib, up to 6 in. long, 1 in. broad
6. *barbatum.*

Racemes slender ; bracts more or less distant ; perianth glandular :—

Ocreae tubular, glabrous, shortly and sparsely ciliate at the mouth ; leaves lanceolate, acute, glabrous except the scabrid midrib beneath, up to 3 in. long, ·75 in. broad ; nutlets both trigonous and plano-convex ..... 7. *Hydropiper.*

Ocreae tubular, strigosely hispid, long-ciliate at the mouth ; leaves lanceolate or elliptic lanceolate, acuminate, strigosely hairy beneath, up to 6 in. long, 1 in. broad .. 8. *flaccidum.*

Inflorescence capitate, the heads single or in corymbs :—

Heads pedunculate, small, sessile in the axil of an involucral leaf ; bracts ovate-oblong, membranous ; perianth 4-fid ; nutlets biconvex or subtrigonous, minutely pitted in lines ; leaves deltoid-ovate, entire, acute, truncate or subcordate at base and decurrent as wings to the amplexicaul petiole, up to 2·5 in. long, 1 in. broad ; ocreae membranous, obliquely truncate, hairy at base ..... 9. *punctatum.*

Heads pedunculate, without an immediate involucral leaf :—

Stems without prickles at the nodes ; heads small, about ·25 in. in diam., much bracteate, perianth 5-fid :—

Heads usually in pairs on glandular hispid peduncles ; bracts ovate, acute, glabrous, chaffy ; nutlets flat or trigonous ; leaves deltoid-ovate, acute, ciliolate, truncate or subcordate at base and shortly decurrent, up to 3 in. long, 2 in. broad ; ocreae tubular below, split at the mouth, truncate, strigose and strigosely ciliate ..... 10. *sphaerocephalum.*

Heads in corymbose terminal panicles, the peduncles glandular hairy ; bracts ovate, acute, glabrous ; nutlets trigonous ; leaves elliptic or ovate, acute or shortly acuminate, the margins entire or crenulate, the petiole auricled, up to 6 in. long, 3 in. broad ; ocreae long, membranous, obliquely cleft, acuminate, and often much split when old 11. *chinense.*

Stems more or less covered with retrorse prickles at the nodes, also on the midrib on the under-surface of the leaves : bracts ovate, acuminate, strigose and ciliate ; heads elongate in short oblong racemes :—

Leaves oblong-lanceolate, acuminate, cordate or hastate at base, prominently prickly on the midrib beneath, up to 3 in. long, 1 in. broad ; ocreae tubular, strigose and long ciliate, prickly at base ..... 12. *strigosum.*

Leaves linear or linear-lanceolate, acuminate, narrowed at base, not prominently but sparsely prickly on the midrib beneath, up to 6 in. long, 1 in. broad ; ocreae tubular, oblique at mouth, glabrous, shortly ciliate, slightly prickly at base ..... 13. *pedunculare.*

1. POLYGONUM PLEBEJUM, R. Br. ; F. B. I. v. 27. *P. indicum*, Heyne ; Wt. Ic. t. 1808.

All plains Districts and up to 5,000 ft. in the hills.

A prostrate herb, usually from a woody rootstock, the

branches flat, the flowers pink, the leaves small, usually, in this area, linear or obovate, up to ·5 in. long (var. *indica*, Hook. f.) but often much smaller and sometimes longer and more linear.

Var. *Miqueliana*, Hook. f. Stems flexuous; leaves obovate, obtuse; flowers with long (·15–·2 in.) pedicels. S. Canara (Hohenacker). The var. *polyneura*, Hook. f., seems to be the same but with shorter pedicels, longer leaves and the ocreae larger and nerved. S. Canara (Hohenacker).

2. POLYGONUM TOMENTOSUM, Willd.; F. B. I. v. 30.

N. Circars, Deccan and Carnatic, in ditches and other wet places.

A stout thick herbaceous plant with prostrate stems rooting at the nodes, the branches erect, thick and very hairy, the flowers large and white, the nutlets large, thick, crustaceous and shining, dark brown.

3. POLYGONUM LANIGERUM, R. Br.; F. B. I. v. 35.

Deccan, Geddesala in Coimbatore at 4,000 ft. (Fischer)

A stout herb, procumbent and creeping below, the branches erect, the flowers small, red or white, the nuts flat and shining: at once recognized by the white cottony wool.

4. POLYGONUM GLABRUM, Willd.; F. B. I. v. 34; Wt. Ic. t. 1797.

N. Circars, Deccan and Carnatic, South to S. Travancore, also E. side of W. Ghâts, up to 5,000 ft. in hilly country, in ditches and wet places.

An erect glabrous annual herb, reaching even 5 ft. in height, rooting from lower nodes, the flowers pink or white, the leaves very slender.

Var. *scabrinerve*, Hook. f. Leaves shorter, scabrid on the midrib beneath; racemes shorter and more closely panicled. W. Ghâts, Pulney Hills at about 6,000 ft.

5. POLYGONUM MINUS, Huds.; F. B. I. v. 36. *P. strictum*, All.; Wt. Ic. t. 1800.

W. Ghâts, Nilgiris and Pulneys, at 5,000–7,000 ft. in bogs and other wet places.

A low herb, creeping and rooting at the nodes, the racemes and leaves small, the small flowers pink.

6. POLYGONUM BARBATUM, Linn.; F. B. I. v. 37; Wt. Ic. t. 1798.

N. Circars, Deccan and Carnatic, in wet places.

An erect annual, conspicuous for the long fimbriate ciliae of the ocreae, the flowers white, the leaves lanceolate.

7. POLYGONUM HYDROPIPER, Linn.; F. B. I. v. 39.

W. Ghâts, Anamalai and Pulney Hills, in wet places up to 6,000 ft.

A stout glabrous but often glandular annual with pink flowers.

8. POLYGONUM FLACCIDUM, Meissn.; F. B. I. v. 39. *P. Donii*, Wt. Ic. t. 1801.

N. Circars and Deccan, in wet places in hill forests, also W. Ghâts, Nilgiris and Pulneys, up to 6,000 ft.

A rather slender herb, with very long filiform flaccid racemes of usually pink flowers.

9. POLYGONUM PUNCTATUM, Buch.-Ham. *P. alatum*, Buch.-Ham.; F. B. I. v. 41. *P. nepalense*, Meissn.; Wt. Ic. t. 1804.

N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft.; hills of the Deccan and Carnatic, usually above 4,000 ft.; W. Ghâts, Nilgiris and Pulneys, above 4,000 ft., a weed in gardens and cultivated land.

A small, more or less procumbent annual, the flowers white or pink.

Var. *Metzianum*, Hook. f. Small and diffusely branched with small leaves and heads, the nutlet biconvex or trigonous. Coorg (Hohenacker), Pulney Hills, above 6,000 ft. (Saulière).

10. POLYGONUM SPHAEROCEPHALUM, Wall.; F. B. I. v. 43 *P. Wallichii*, Wt. Ic. t. 1805.

W. Ghâts, Nilgiris, above 7,000 ft., especially on Doddabetta (Gamble, Lawson).

A somewhat creeping herb. The leaves are larger than in North Indian specimens.

11. POLYGONUM CHINENSE, Linn.; F. B. I. v. 44; Wt. Ic. t. 1806.

N. Circars, Mahendragiri Hill in Ganjam (Fischer); Deccan and Carnatic, in the hills, scarce; W. Ghâts, in all Districts above 3,000 ft., common.

A rambling undershrub, semi-scandent over bushes, with white or pink flowers, variable in shape and size of leaf, the large elliptic ones (var. *ovalifolium*) perhaps the most common.

12. POLYGONUM STRIGOSUM, R. Br.; F.B.I. v. 47. *P. horridum*, Buch.-Ham.; Wt. Ic. t. 1803.

W. Ghâts, Nilgiri and Pulney Hills, above 5,000 ft., in wet places.

A herbaceous plant with pink flowers, the nutlets trigonous, the stems at first decumbent and rooting, the branches erect.

13. POLYGONUM PEDUNCULARE, Wall.; F. B. I. v. 48; Wt. Ic. t. 1802 C.

W. Ghâts, Pulney Hills.

A glabrous erect herb with lanceolate acute leaves up to 3 in. long, 1 in. broad, the heads very small, in slender dichotomous glandular cymes.

Var. *nilagiricum*, Hook. f. Leaves linear-oblong or oblong-lanceolate, up to 6 in. long, ·75–1 in. broad, the stems glabrous, the heads rather large. Nilgiri Hills, at 6,000 ft. (C. B. Clarke).

Var. *robustum*, Hook. f. Leaves linear-lanceolate, acuminate at both ends, up to 6 in. long, ·75 in. broad, the stems scabrid, the heads rather large (Wt. Ic. t. 1802 B).

Var. *angustissimum*, Hook. f. Leaves narrowly linear up to 5 in. long, ·3 in. broad, the stems nearly smooth, the heads often subcylindric (Wt. Ic. t. 1802 A). Nilgiri Hills at 6,000 ft.

P. molle, D. Don, is a shrubby species of the E. Himalaya, cultivated and now run wild in the higher Nilgiri Hills.

2. Rumex, Linn.

Annual or perennial herbs, rarely shrubs. *Leaves* various, mostly radical or cauline, alternate; stipules hyaline, ocreate, often disappearing with age. *Flowers* hermaphrodite monoecious or dioecious, in axillary clusters or in whorls arranged in simple or panicled racemes; pedicels jointed; bracts ocreate; bracteoles 0. *Perianth* simple, calycine; segments 6, rarely 4, the inner accrescent, entire or toothed, the midrib often enlarged or tubercled. *Stamens* 6; filaments short; anthers oblong. *Ovary* trigonous; ovule solitary; styles 3; stigmas fimbriate. *Fruit* a small nut, enclosed in the usually enlarged inner perianth-segments, the angles acute. *Seed* erect; embryo lateral, nearly straight; cotyledons linear or oblong.

Flowers hermaphrodite; stout herbs; inner perianth-segments coriaceous in fruit:—

Inner perianth-segments lanceolate, acute, entire or with few teeth, a very conspicuous oblong tubercle on the back; leaves oblong panduriform, obtuse, cordate at base, the margins waved or crisped, up to 8 in. long, 1·5 in. broad ..... 1. *nigricans.*

Inner perianth-segments orbicular-ovate, reticulate, the margins with many teeth with hooked tips, one or more with a rather small tubercle on the back; leaves oblong- or triangular-ovate, acute or obtuse, cordate at base, up to 14 in. long, 5 in. broad

2. *nepalensis.*

Flowers monoecious; fleshy herbs; inner perianth-segments membranous and reticulate in fruit; leaves elliptic or oblong, cordate or hastate at base ..... *vesicarius.*

Flowers dioecious; slender herbs; inner perianth-segments very small, oblong, closely appressed to the nut in fruit; leaves small, lanceolate or hastate ..... *Acetosella.*

1. RUMEX NIGRICANS, Hook. f.; F. B. I. v. 59.

N. Circars, on the Godavari (Gamble).

An erect stout annual herb reaching 1·5 ft. high, the stem grooved, the leaves with long slender petioles. The inflorescence is black when dry or nearly so.

2. RUMEX NEPALENSIS, Spreng.; F. B. I. v. 60; Wt. Ic. t. 1810.

W. Ghâts, Nilgiri and Pulney Hills, above 6,000 ft.

A tall stout annual or perennial herb, sometimes with tuberous roots, the stems grooved, the leaves long-petioled.

R. vesicarius, Linn., is an annual herb, wild in the W. Himalayas elsewhere cultivated as a vegetable. It is at once recognized by the membranous pink or white reticulate inner fruiting perianth.

R. Acetosella, Linn., is a European common herb, the Sheep Sorrel, introduced and now run wild in the Nilgiris.

Fagopyrum esculentum, Moench., is the Buckwheat, occasionally grown as a grain crop in the hills. *Antigonon Leptopus*, Hook. & Arn., is the Coral Creeper, a large handsome climbing shrub with pink flowers, a native of S. America and commonly grown in Indian gardens. *Muehlenbeckia platyclados*, Meissn., is a glabrous erect shrub, native of the Solomon Islands and often grown in Indian gardens. It has smooth flattened leaf-like branches and small flowers in lateral fascicles

Family CXXI. PODOSTEMONACEAE.

After J. C. Willis in the 'Annals of the Royal Botanic Gardens, Peradeniya, Ceylon,' vol. i, pp. 181 and 267 (1902), with plates.

Aquatic herbs, usually annual, submerged and closely attached to rocks, the flowers appearing and the seeds germinating at the close of the rainy season when exposed by the fall of the water-level. Primary axis early giving rise to a *thallus*—the part of the plant that creeps on the rocks or lies near to them. Secondary shoots appear from the thallus, and may be found as rosettes of leaves or as growing or branching leaf-bearing axes. *Leaves* very simple and delicate (easily lost), changing to bracts and finally ending in a *spathe* or cupule which encloses the young flower. *Flowers* hermaphrodite, small, regular and trimerous with a perianth or zygomorphic and bimerous without one. *Stamens* hypogynous, in regular flowers 3, alternate with the perianth-segments, in zygomorphic flowers usually 2, monadelphous and usually with 2 staminodes; anthers introrse, 2-celled. *Ovary* superior, 2-3-celled, with thick placenta and delicate septa; ovules numerous, anatropous; stigmas 2-3. *Fruit* a usually pedicellate capsule, ribbed or smooth, septifragal. *Seeds* usually numerous, minute (in *Farmeria* 2 or 4); testa mucilaginous; albumen 0; embryo straight.

Flowers regular; perianth of 3 segments; stamens 3:—

Thallus a thread-like creeping root; secondary shoots long, complexly branched, freely floating, bearing ramuli or moss-like shoots of limited growth; floral axis subtended by few leaves, sometimes slightly connate ..... 1. **Tristicha.**

Thallus frondose, foliferous, creeping, closely attached to rocks; secondary shoots of small rosettes of leaves on upper side of thallus; floral shoots arising from axial cupules ..... 2. **Lawia.**

Flowers zygomorphic, naked; stamens 1-3:—

Fruit ribbed, iso- or aniso-lobous, dehiscent, with many seeds; spathe erect, more or less cylindrical, opening at apex by several teeth:—

Thallus fucoid or dimorphic, usually freely floating; secondary shoots 1-flowered with scaly bracts; fruit isolobous ..3. **Dicraea.**

Thallus thread- or ribbon-like, creeping; secondary shoots erect with several flowers; bracts dithecous, not scaly; fruit aniso-lobous ..... 4. **Podostemon.**

Fruit smooth, anisolobous, dehiscent, with many seeds; spathe erect, toothed or bifid :—

Thallus fucoid or attached and closely creeping; secondary shoots small, with distichous leaves.....5. **Griffithella.**

Thallus crustaceous, attached to rock; secondary shoots large, erect, with 4-ranked leaves; spathe bilobed at tip ..6. **Willisia.**

Fruit ribbed, iso- or aniso-lobous, dehiscent, or smooth aniso-lobous, dehiscent or indehiscent, with many or few seeds; spathes more or less prostrate, splitting along the upper side; thallus closely attached to rock :—

Thallus crustaceous or ribbon-like, exogenously lobed or branched; secondary shoots usually prostrate when floriferous, 1-flowered with small scaly bracts; seeds very many, fruit dehiscent, iso- or aniso-lobous, ribbed or smooth

7. **Hydrobryum.**

Thallus ribbon-like, endogenously branched; secondary shoots as in *Hydrobryum* but behind the branches of thallus; seeds 2–4, fruit dehiscent or not, ribbed or not.....8. **Farmeria.**

1. Tristicha, Dup.-Th.

Submerged herbs with the habit of *Fontinalis* and other aquatic mosses, the roots creeping, filamentous, attached by feet; secondary shoots very many, often more or less paired on opposite sides, floating freely in the water. When most developed often long, many-flowered and frequently branched, but often quite short, unbranched and 1-flowered or vegetative only; branches of 2 kinds, long ones with the structure of the main axis and short ones consisting of a delicate axis with very many small *leaves* often tristichous. *Flowers* terminal, on pedicels subtended by 2–3 large or several ordinary leaves, the upper ones often more or less united; pedicel and ovary with deciduous cortex, which shrivels after flowering, the small flowers usually emerging through the water at the beginning of the dry season.

TRISTICHA RAMOSISSIMA, Willis. *Terniola ramosissima*, Wedd.; F. B. I. v. 63. *Dalzellia ramosissima*, Wt. Ic. t. 1920, f. 1.

W. Ghâts, rivers of S. Canara, Malabar, Cochin and Travancore (Johnson, Bourdillon, etc.), also Anamalai Hills, up to 4,000 ft.

A floating plant with very long filiform much-branched stems, narrowly linear leaves in tufts round the single

pedicellate flower, which has 3 stamens and 3 long filamentous hairy stigmas. Branchlets not tristichous.

2. Lawia, Griff.

Herbs with frondose thalli, living on smooth rocks in rapids d waterfalls, submerged during the S.W. monsoon, flowering the dry season when exposed. *Thallus* closely attached to the ck, suborbicular or stellate, attached by root-hairs, usually ich branched with ribbon-like or flabelliform lobes. *Leaves* ry numerous, simple, entire, usually acute, green or red, occurng either on the upper surface and edges of the thallus or in sely-packed rosettes on its older parts. *Flowers* terminal on e growing points of the margins of the thallus, rarely on the per surface, solitary, on pedicels emerging from terminal axial fy cupules; pedicel in flowering time ·1–·25 in. long, covered, also the ovary, with a pellucid cellular cortex, which falls off er flowering, leaving an elastic pedicel up to 1·25 in. long, erect. *amens* 3, alternating with the perianth-segments; anthers 2-led, opening longitudinally. *Capsule* ellipsoid or obovoid, ibbed, 3-celled, septifragal, valves incurved after dehiscence.

LAWIA ZEYLANICA, Tul. *Terniola zeylanica*, Tul.; F. B. I. v. 32. Var. *malabarica*, Willis.

W. Ghâts, S. Canara, at Sullia and Beltangadi (Barber); Tambraparni River in Tinnevelly (Barber).

A frondose plant with thallus closely adhering and branching the fruiting pedicel about ·3 in. long, the fruit obovoid-elliptical.

3. Dicraea, Tul.

Submerged herbs with the habit of *Fucus* and other seaweeds. *allus* various, usually freely floating from an attached base, genously branched, with marginal ultimately 1-flowered ondary shoots; leaves usually subulate. *Flowers* zygorphic, enclosed in spathes splitting irregularly at the tip and tended by 2–8, usually 4, fleshy scaly bracts. *Stamens* 2 or 1, h staminodes on either side of the common axis. *Ovary* ooth, ripening to a 8- or rarely 8–12-ribbed isolobous fruit h very many seeds.

allus narrow, ribbon-like, flattened, attached at base, freely floating ve, up to 1 ft. long; pedicels about ·75 in. long.... 1. *dichotoma*.

Thallus broad, algiform, freely **branched, creeping** or floating from an attached base, up to 1·5 ft. long; **pedicels** up to 1·5 in. long
2. *stylosa.*

1. DICRAEA DICHOTOMA, Tul.; Wt. Ic. t. 1916, f. 2. *D. Wightii*, Tul.; Wt. Ic. t. 1916, f. 3. *D. longifolia*, Wt. Ic. t. 1916. f. 4. *D. rigida*, Wt. Ic. t. 1916, f. 5. *Podostemon dichotomus*, Gardn.; F. B. I. v. 64.
W. Ghâts, Nilgiris and Malabar Hills, up to 8,000 ft., on rocks in rapids.
Thallus narrow, usually zigzag, the leaves filiform.
2. DICRAEA STYLOSA, Wt. Ic. t. 1917, f. 2. *D. algaeformis*, Bedd.; Trans. Linn. Soc. xxv. t. 24. *Podostemon stylosus*, Benth.; F. B. I. v. 64. *P. algaeformis*, Benth.; F. B. I. v. 65.
W. Ghâts, S. Canara to Travancore, Nilgiris and Anamalais, up to 5,000 ft.
Thallus broad, seaweed-like, the bracts helmet-shaped.

4. Podostemon, Michx.

Herbs of eddies and rapids, in mountain streams. *Thallus* thread- or ribbon-like; secondary shoots ascending, several-flowered, with long subulate leaves and no scaly bracts. *Flowers* zygomorphic, naked, terminal with a tubular or funnel-shaped erect spathe rupturing irregularly at the tip. *Stamens* 2 or 1, monadelphous, with a staminode at each side of the common axis, and sometimes at the fork of the partial filaments. *Ovary* ellipsoid; stigmas 2, simple, subulate, with small papillae. *Fruit* unequally lobed, 8-ribbed, one valve persistent with 3 decurrent ribs, the other deciduous.

Stamens usually 2; flowers not cleistogamic; ovary not winged
1. *subulatus.*
Stamen 1; flowers cleistogamic; ovary with 6 broad wings
2. *Barberi.*

1. PODOSTEMON SUBULATUS, Gardn.; F. B. I. v. 65; Wt. Ic. t. 1918, 1.
W. Ghâts, Anamalai Hills, on the Monica Estate at 3,500 ft. (Willis, Barber).
Easily recognized by the long slender subulate leaves, attached to the rocks in tufts and sheathing at base.

2. PODOSTEMON BARBERI, Willis.

W. Ghâts, hills of S. Canara, at Beltangadi (Barber)

A little-known species, with broad thallus, closely attached to the rock, the spathe very long, the fruit pedicel up to ·8 in. long.

5. Griffithella, Warming.

Minute herb attached to rocks in running streams. *Thallus* algiform, very polymorphous; secondary shoots marginal or on central parts, small with included axis in vegetative condition, ultimately slightly exserted. *Leaves* distichous. *Flowers* naked, zygomorphic, emerging from an erect or ascending tubular or funnel-shaped spathe irregularly split at the tip. *Stamens* 2, monadelphous; staminodes 2, at the sides of the filament-sheath *Ovary* very oblique; stigmas 2, simple, subulate or more or less lobed, with small papillae. *Capsule* quite smooth, nearly spherical, unequally lobed, splitting obliquely into a larger persistent and smaller deciduous lobe.

GRIFFITHELLA HOOKERIANA, Warming. *Podostemon Hookerianus*, Wedd.; F. B. I. v. 65. *Mniopsis Hookeriana*, Tul.; Wt. Ic. t. 1918, f. 4.

W. Ghâts, in S. Canara at Beltangadi and Sullia (Barber).

A curious lichen-like plant. The S. Canara plants belong to the var. *G. Willisiana*, Warming, characterized by a short spathe and toothed or fimbriate stigmas, the fruiting pedicels ·1–·6 in. long.

6. Willisia, Warming.

Small tufted herbs with erect imbricate shoots. *Thallus* small, crustaceous, fleshy, closely attached to the rock; secondary shoots crowded, erect, forming a dense tuft, the shoots with imbricate scaly leaves; in addition, during the vegetative season one or more shoots are found with leaves not imbricate but long and filiform and non-floriferous. *Leaves* of floriferous shoots decussate and triquetrous. *Flowers* naked, zygomorphic, sessile, terminal, the spathes bifid at tip. *Stamens* 2, monadelphous, with two staminodes. *Ovary* ellipsoid; stigmas 2, subulate, smooth. *Capsule* smooth, with a slight rib in the centre of each valve, anisolobous, one valve deciduous, the other persistent on a bifid stalk, when the non-vascular tissues fall away.

WILLISIA SELAGINOIDES, Warming. *Mniopsis selaginoides*, Bedd.; Trans. Linn. Soc. xxv. t. 28. *Podostemon selaginoides*, Benth.; F. B. I. v. 58.

W. Ghâts, Anamalais to 3,500 ft. (Beddome, Wight, Barber, Willis).

A very curious species with shoots resembling *Lycopodium Selago*, attached in tufts to the thallus on rocks.

7. Hydrobryum, Endl.

Small green herbaceous plants closely attached to rocks. *Thallus* crustaceous or branched; secondary shoots marginal with 3–8 bracts, usually prostrate. *Leaves* simple, subulate. *Flowers* zygomorphic, stalked or sessile, emerging from a boat-shaped spathe splitting mainly along the upper side. *Stamens* 2 or 1, equalling or exceeding the ovary, staminodes linear. *Ovary* subglobose, 2-celled; stigmas 2, rather large, subulate or lobed or dentate, sometimes obcuneate, entire or lacerate. *Fruit* small, sessile or stalked, smooth or 8-12-ribbed, isolobous or anisolobous with numerous seeds.

Fruit sessile, smooth, thallus branched ..... 1. *sessile.*
Fruit stalked, 8-ribbed :—
Thallus crustaceous, stamens short ..... 2. *olivaceum.*
Thallus crustaceous, stamens very long ..... 3. *Johnsonii.*
Thallus ribbon-like, branched, stamens of varying length 4. *lichenoides.*

1. HYDROBRYUM SESSILE, Willis.

W. Ghâts, streams of S. Canara, at Beltangadi (Barber).

A curious little plant with distichous bracts bearing the sessile fruit.

2. HYDROBRYUM OLIVACEUM, Tul.; Wt. Ic. t. 1918, f. 2. *H. griseum*, Tul.; Wt. Ic. t. 1918, f. 3. *Podostemon olivaceus*, Gardn.; F. B. I. v. 66.

W. Ghâts, Anamalai Hills, at 3,500 ft. (Barber, Willis), form *anamalaiense*; Nilgiris, Pykara River at 5,000–6,000 ft. (Gardner, Brandis, Willis), form *griseum*

A common very small species "easily distinguishable by its crustaceous thallus and erect clearly-ribbed fruit."

3 HYDROBRYUM JOHNSONII, Willis. *Mniopsis Johnsonii*, Wt. Ic. t. 1918, f. 5. *Podostemon Johnsonii*, Wedd.; F. B. I. v. 66.

W. Ghâts, mountain streams in Malabar (Johnson).

4. HYDROBRYUM LICHENOIDES, Kurz. *Podostemon acuminatus*, Wedd.; F. B. I. v. 66. *P. microcarpus*, Wedd.; F. B. I. v. 66.

W. Ghâts, streams of S. Canara (Barber), form *Kanarense*; Anamalai Hills, at 3,500 ft. (Willis), form *Fentonii*.

The most common, but also the most variable species.

8. Farmeria, Willis.

Dendritically-branching herbs, adherent to smooth rocks in eddies and rapids. *Thallus* ribbon-like, closely attached, regularly branched; secondary shoots as in *Hydrobryum* but behind the branches of thallus instead of in anterior axils. *Bracts* prostrate, thicker on upper side, usually about 6, scaly, with deciduous tips; spathe as in *Hydrobryum*, splitting on upper side. *Stamen* 1 usually. *Ovary* more or less globose, with thickened placenta and 2–4 ovules on the under-side; lower loculus more or less abortive; stigmas large, subulate. *Fruit* small, the upper lobe larger, 2–4-seeded.

FARMERIA INDICA, Willis.

W. Ghâts, Tambraparni river, near Tinnevelly (Barber).

A small species with thread-like thallus and ribbed, dehiscent, shortly stalked, 4-seeded fruits.

Family CXXII. ARISTOLOCHIACEAE.

Herbs or shrubs, often climbing, usually with more or less unpleasant odour. *Leaves* alternate, petioled, entire or lobed; stipules 0. *Flowers* hermaphrodite, often large, usually lurid; terminal axillary or lateral, solitary racemose or cymose; bracts various, often 0. *Perianth* simple, corolline, superior, regular or irregular, 3-lobed or tubular and variously shaped; lobes valvate. *Stamens* 6 or more, adnate in 1 or 2 series to the style-column; anther-cells parallel, extrorse, opening dorsally. *Ovary* 4–6-celled; placenta parietal, free or meeting at the axis; ovules numerous, anatropous; style columnar, ending in stigmatic lobes. *Fruit* a capsule or berry. *Seeds* numerous, horizontal or pendulous; albumen fleshy, copious; embryo minute.

Shrubs; perianth regular, equally 3-lobed; capsule elongate; leaves ribbed and reticulate ....1. **Apama.**

Trailing or climbing herbs or shrubs; perianth irregular, tubular with

an inflated base and 2-lipped limb; capsule septicidally 6-valved; leaves various .....2. **Aristolochia.**

1. Apama, Lamk.

Shrubs or undershrubs, often with stellate hairs *Leaves* alternate, petiolate, 3–5-ribbed at the base, the ribs often extending beyond the middle, nerves and reticulation prominent. *Flowers* in axillary terminal or subradical bracteate cymes. *Perianth* shortly campanulate, 3-lobed, the lobes valvate. *Stamens* 6–12, 1-seriate, free or connate near the base; anthers extrorse, the cells parallel, the connective thick and sometimes produced. *Ovary* inferior, elongate, 4-celled; style-column thick; stigmas 3 or more, linear; ovules numerous, uniseriate in vertical rows from the axis, pendulous. *Fruit* an elongate, 4-gonous, septicidally 4-valved capsule. *Seeds* many, oblong, trigonous, rugose or pitted; albumen fleshy; embryo minute.

Leaf with the ribs next to the midrib prominent and reaching nearly three-quarters of the way up, nerves 3 4 pairs from the midrib; perianth-lobes suborbicular, slightly acute at apex; anthers in 3 groups of 3, the connectives shortly apiculate; style column short, the stigmas longer.....1. *siliquosa.*

Leaf with the ribs next to the midrib like the nerves, scarcely reaching halfway up, nerves from the midrib 6–10 pairs, joining in arches; perianth-lobes obovate, abruptly apiculate; anthers free with slender filaments, the connective produced in a triangular apiculus; style-column long, the stigmas about as long .....2. *Barberi.*

1. **Apama siliquosa**, Lamk. *Bragantia Wallichii*, R. Br.; F. B. I. v. 73; Wt. Ic. t. 520

   W. Ghâts, in all Districts, in evergreen forest undergrowth, up to 4,000 ft.

   An erect shrub with grey bark, the very reticulate distichous leaves oblong lanceolate or oblanceolate, long-acuminate, up to 9 in. long, 2·5 in. broad, the erect capsules up to 4 in. long.

2. **Apama Barberi**, Gamble in Kew Bull. 1924, 386.

   W. Ghâts, Kannikatti in Tinnevelly (Barber).

   A shrub with branches covered with long corky lenticels, the leaves lanceolate, acuminate, with shorter side ribs and many more nerves than the former species, up to 8 in. long, 2 in. broad.

2. Aristolochia, Linn.

Shrubs or perennial herbs, prostrate or climbing. *Leaves* alternate, entire or lobed, often with a stipule-like leaf of an undeveloped bud in the axil; petiole dilated at base. *Flowers* solitary or fascicled or racemose in the leaf-axils; bracts often rather large. *Perianth* very variable in shape, size and colour, the tube inflated below, then contracted in a cylindrical neck, then expanded in a dilated oblique usually 2-lipped limb. *Stamens* usually 6, adnate to and around the style-column; anther-cells 2, extrorse. *Ovary* inferior, more or less 6-celled; placenta parietal or intruded or connate in the axis; ovules very many, 2-seriate; style-column thick, divided above the anthers in a 3-6-lobed stigmatiferous disk. *Fruit* a septicidal capsule, 6-valved or splitting through the placentas. *Seeds* numerous, horizontal, often covered in part with the remains of the placenta; albumen fleshy; embryo minute, close to the hilum.

Stems prostrate; leaves glaucous, reniform or broadly ovate, cordate at base with a wide sinus, up to 3 in. in diam.; flowers solitary with a large orbicular bract, tube and limb 1–1·75 in. long; stigmatic lobes glandular hairy; seeds flattened but thickened, one side completely covered with round glands, ·2 in. long ..... 1. *bracteata.*
Stems twining; leaves green; flowers in racemes with small bracts; seeds winged:—
Leaves very variable, linear to obovate-oblong or subpanduriform, rounded or slightly cordate at base, up to 6 in. long, 3 in. broad; tube and limb of perianth 1·5 in. long; stigmatic lobes incurved; seeds flattened, thin, broadly winged, glands only opposite the cotyledons, ·3 in. long ..... 2. *indica.*
Leaves large, ovate, acute or acuminate, deeply cordate with a deep but narrow sinus, the upper lanceolate, up to 8 in. long, 4·5 in. broad; tube and limb of perianth 1–1·5 in. long; stigmatic lobes in a cone; seeds flattened, broadly winged, glands only in the middle, ·3 in. long ..... 3. *Tagala.*

1. ARISTOLOCHIA BRACTEATA, Retz; F. B. I. v. 75.

N. Circars, Deccan and Carnatic, on dry soils, especially black-cotton.

A perennial herb with greenish tube and dark purple lip to the perianth, which is linear with revolute margins, the capsule about ·75 in. long, oblong-ellipsoid, 12-ribbed. A

nauseously bitter plant, used as an anthelmintic. Vern. *Hind.* Kiramar; *Ur.* Paniri.

2. ARISTOLOCHIA INDICA, Linn.; F. B. I. v. 75. *A. lanceolata*, Wall.; Wt. Ic. t. 1858.

All Districts, at low levels, on hedges and among bushes.

A perennial twiner with greenish-white tube, the lip darker and oblong, the capsules 1·5–2 in. long, ribbed. A bitter plant like the former, said to be an antidote to snake-bite. Vern. *Hind.* Isharmal; *Tel.* Isara.

3. ARISTOLOCHIA TAGALA, Cham. *A. Roxburghiana*, Klotzsch; F. B. I. v. 75. *A. acuminata*, Roxb.; Wt. Ic. t. 771.

W. Ghâts, S. Canara and Mysore to Tinnevelly, at rather low levels and chiefly on the E. side.

A climbing shrub with greenish-yellow tube and purple-brown lip to the flowers, the capsule very variable in size, up to 2 in. long and long-stalked.

Family CXXIII. PIPERACEAE.

Herbs or shrubs, usually aromatic, the branches often swollen at the nodes. *Leaves* alternate opposite or whorled, often gland-dotted; stipules none or 2 connate or adnate to the petiole. *Flowers* minute, hermaphrodite or unisexual, bracteate, in axillary or terminal catkin-like spikes. *Perianth* 0. *Stamens* 1–10, hypogynous or connate with the ovary at its base; anthers often jointed on the filaments, the cells dehiscing longitudinally. *Ovary* usually 1-celled with a single terminal orthotropous ovule, sometimes of 3–4 carpels; stigmas sessile, simple or penicillate. *Fruit* an indehiscent berry in species with 1 cell, otherwise of separate cocci or follicles. *Seed* adherent to the endocarp, globose ovoid or oblong; testa thin; albumen floury; embryo in a cavity remote from the hilum; cotyledons minute or obsolete; radicle superior.

Flowers dioecious; spikes solitary; fruit an ovoid or globose fairly large berry; leaves usually with prominent ribs .....1. **Piper.**

Flowers hermaphrodite, very small :—

Spikes soft and thick, 3–7 together in umbels; berry trigonous, cuneiform; leaves often very large, orbicular-cordate..2. **Heckeria.**

Spikes slender, solitary fascicled or panicled; berry very minute, dry, globose or ovoid; leaves usually small and succulent

3. **Peperomia.**

1. Piper, Linn. (in part).

Shrubs, rarely herbs, erect or scandent, often glandular and aromatic, the branches with swollen nodes. *Leaves* entire, often unequal-sided; stipules various. *Flowers* minute, dioecious, rarely hermaphrodite, each in the axil of a bract with or without lateral bracteoles, arranged in spikes often very closely congested and usually opposite the leaves. *Perianth* 0. *Stamens* 2–4, rarely more; filaments short; anthers 2-celled, the cells distinct. *Ovary* 1-celled; ovule solitary; style short or 0; stigmas 2–5. *Fruit* a small ovoid or globose 1-seeded berry. *Seeds* usually globose; testa thin; albumen floury; radicle superior.

Flowers in cups probably formed of connate bracts making receptacles alternate on rather fleshy spikes; leaves elliptic-ovate or -lanceolate, 3-ribbed at base with another pair a little higher up, the nervules reticulate :—

Receptacles distant, stalked, recurved, the spikes glabrous, ♂ very long ..... 1. *galeatum.*

Receptacles close, sessile, globose, the spikes minutely pubescent or downy ..... 2. *trichostachyon.*

Flowers subtended by peltate orbicular bracts, ♂ with 2 stamens, ♀ with sessile stigmas, usually 3–5-lobed; berries partly sunk in the rhachis :—

Leaves with prominent ribs from the base or near it :—

Fruiting spikes cylindric, thick; ♂ spikes narrow :—

Leaves glabrous :—

Fruiting spikes about ·75 in. long, ·25 in. thick; ♂ spikes 1–3 in. long; upper leaves ovate or ovate-oblong, acute, often unequally cordate at base, sessile and amplexicaul, lower leaves ovate, deeply and widely equally cordate, petioled, all 7-ribbed, glabrous ..... 3. *longum.*

Fruiting spikes up to 5 in. long, ·5 in. thick, ♂ spikes 3–6 in. long, very narrow; leaves ovate-oblong or ovate-cordate, petioled, 5–7-ribbed, glabrous ..... *Betle.*

Leaves pubescent, especially on the nerves beneath and the lower surface when young, later nearly or quite glabrous, lanceolate, acuminate, very unequally cordate with incurved auricles at base, 7-nerved, rugose or bullate, up to 4 in. long, 2 in. broad, fruiting spikes ·75 in. long, ♂ spikes slender, 1–1·5 in long ..... 4. *Hapnium.*

Fruiting spikes globose, ·3–·5 in. in diam., ♂ spikes very slender,

2–3 in. long ; leaves elliptic-ovate or -lanceolate, obtusely caudate-acuminate, acute at base, 3–5-ribbed with another pair a little higher up, shortly petioled .....5. *brachystachyum.*
Fruiting spikes loose and often interrupted, ♂ spikes narrow, elongate :—

Leaves somewhat coriaceous, ovate, acute or obtusely acuminate, obtuse or subcordate at base, sparsely hirsute, 5–7-ribbed from the base or close to it, up to 4 in. long, 2 in. broad ; ♀ spikes very slender when young, 2 in. long .....6. *Hookeri.*
Leaves very coriaceous, elliptic-ovate or ovate-oblong, obtusely acute or rarely acuminate, obtuse or shortly cordate at base, 3–5-ribbed from the base with another pair about ·25 in. above it and usually alternate ; all ribs as well as transverse nerves and reticulation very prominent, margin often recurved, up to 4·5 in. long, 2·5 in. broad ; ♂ spikes usually about 4 in. long, ♀ spikes stout, the fruit fleshy.....7. *Schmidtii.*

Leaves pinnately nerved, not ribbed, the nerves 5–6 pairs, lanceolate, long acuminate, unequally acute at base, glabrous, up to 6 in. long, 2 in. broad ; stipules lanceolate, ·5–·75 in. long ; ♂ spikes 3–4 in. long, narrow, on slender peduncles up to 3 in. long, ♀ not known.....8. *Barberi.*

Flowers subtended by bracts adnate to the rhachis :—

Bracts forming a short cup under the flowers (♂, ♀ or ☿) the bracteoles in ♀ in a hood-like ridge above ; leaves coriaceous, broadly ovate (in ♂ often elliptic and narrow), acuminate, glabrous, 5–9-ribbed, 2–3 pairs of ribs basal, the others higher up, often impressed above, up to 9 in. long, 4·5 in. broad ; ♂ spikes slender, usually 4–5 in. long, ♀ slender, up to 6 in. long, the berries large, ·25 in. in diam. or more .....9. *nigrum.*

Bracts adnate to the rhachis with decurrent free membranous margins, confluent in the ♀ with the bracteoles above the ovary, under-surface crispate-hairy :—

Leaves membranous :—

Leaves beneath, also branchlets and petioles, pubescent with crisped hairs ; leaves variable in shape, usually ovate or elliptic-ovate, abruptly acuminate, rounded or cordate, often unequally, at base, 5–7-ribbed from the base, two upper pairs a little higher and extending to the tip, up to 5 in. long, 3·5 in. broad ; ♂ spikes slender, 3 in., ♀ to 6 in. or more....10. *hymenophyllum.*
Leaves beneath covered with round silvery scales, above often bullate ; leaves variable in size, elliptic or lanceolate, acuminate, acute and often oblique at base, 5–7-ribbed, the upper pair rather

higher up and reaching the tip, up to 6 in. long, 2·5 in. broad; ♂ spikes very slender, 4–6 in., ♀ to 6 in. ..11. *argyrophyllum.*
Leaves and branchlets quite glabrous, ovate or suborbicular, abruptly acuminate, rounded or cordate, sometimes obliquely, at base, 7-ribbed from the base or close to it, up to 4 in. long, 3·5 in. broad; the ♂ spikes extremely slender, to 6 in., ♀ elongate, up to 10 in. long .....12. *attenuatum.*
Leaves coriaceous, glabrous, broadly ovate or orbicular, rarely elliptic, abruptly acute, rounded or cordate at base, 5–7-ribbed quite from the base or the upper 2 a little above it, the nerves transverse and reticulate, joining the ribs, up to 5 in. long, 3 in. broad; ♂ and ♀ spikes rather thick, 3–4 in. long, elongating in fruit, the globose berries rather close .....13. *Wightii.*

1. PIPER GALEATUM, Cas. DC.; E. B. I. v. 80. *Muldera Wightiana*, Wt. Ic. t. 1943 (*right-hand figure only*).
W. Ghâts, Anamalai and Travancore Hills (Barber) and Courtallum Hills of Tinnevelly (Wight) in dense forest undergrowth at low levels.
A woody climber with pale corky branches much thickened at the nodes, often attaching itself like the ivy by rootlets as well as climbing with hanging branches. When rooting, the leaves are larger, rounder and often cordate. The ripe berries are deep orange, ·3 in. in diam. (Barber).
2. PIPER TRICHOSTACHYON, Cas. DC.; F. B. I. v. 80. *Muldera trichostachya*, Miq.; Wt. Ic. t. 1944.
W. Ghâts, Mysore, Coorg up to 2,500 ft., Wynaad in Malabar (Barber); Sivagiri Hills of Tinnevelly (Wight).
A very large woody climber, very similar to the last and similarly climbing and rooting, but the leaves usually more elliptic and smaller. The ripe berries are globose, yellow, and the ♂ cupules waxy white (Cooke).
3. PIPER LONGUM, Linn.; F. B. I. v. 83. *Chavica Roxburghii*, Miq.; Wt. Ic. t. 1928.
W. Coast and W. Ghâts, in evergreen forests in Malabar and Travancore, Anamalai Hills, at low levels; often cultivated. Long Pepper.
A slender undershrub, creeping and rooting below, the branches erect and subscandent. The small berries are red when ripe and afford a kind of pepper, and are also used in medicine. Vern. *Hind.* Pipalmal; *Tam.* Vettilai.

4. **Piper Hapnium**, Buch.-Ham.; F. B. I. v. 86.
W. Ghâts in the hills of Travancore and Tinnevelly (Hamilton, Wight).
A slender climbing undershrub with warted puberulous branches rooting from lower joints, the leaves soft and wrinkled, their bases prominently incurved in rounded auricles.

5. **Piper brachystachyum**, Wall.; F. B. I. v. 87. *Chavica sphaerostachya*, Miq.; Wt. Ic. t. 1931.
W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Travancore, in Shola forest, above 5,000 ft.; Bababudan Hills of Mysore.
A much-branched woody climber, trailing up the branches of trees and over rocks and rooting like ivy. The slender rooting branches are tomentose and corky, and have quite small ovate leaves; those on the terete spreading branches may reach 6 in. long, 2 in. broad.

6. **Piper Hookeri**, Miq.; F. B. I. v. 88.
Bababudan Hills of Mysore (Cleghorn).
A climbing shrub, rooting ivy-like, with stout branches, the branchlets hirsute.

7. **Piper Schmidtii**, Hook. f.; F. B. I. v. 89. *P. arborescens*? Wt. Ic. t. 1940 (*right-hand figure only*).
W. Ghâts, Nilgiri Hills, above 5,000 ft., in Shola forests (Schmidt, King and others).
A large and ornamental shrub, climbing on trees and covering their trunks and branches, the strongly reticulate nervation of the coriaceous leaves very conspicuous.

8. **Piper Barberi**, Gamble in Kew Bull. 1924, 387.
W. Ghâts, hills of Tinnevelly (Barber).
A very little-known species at once remarkable for the absence of ribs to the leaves which are pinnately nerved instead.

9. **Piper nigrum**, Linn.; F. B. I. v. 90.
W. Ghâts, in all Districts, at 1,500–5,000 ft., in evergreen forest; largely cultivated. Black or White pepper.
A stout glabrous climbing shrub, at first rooting at the nodes like ivy, the leaves small and cordate, gradually getting larger, later sending out strong flowering branches with large leaves and berries up to ·25 in. diam. Dr.

Barber would apparently separate a form with big berries but it hardly seems even of varietal rank. It probably arose from chance cultivated seeds.

10. PIPER HYMENOPHYLLUM, Miq.; F. B. I. v. 93; Wt. Ic. t. 1942.

W. Ghâts, from Mysore and the Nilgiris southwards, in evergreen forests, at 1,500–5,000 ft.

A slender climber at first rooting at the nodes and having broad cordate leaves, afterwards spreading and branching, with narrower and often elliptic variable leaves, the berry small. Berries small, globose, or slightly oblong, ·1–·2 in. in diam.

11. PIPER ARGYROPHYLLUM, Miq.; F. B. I. v. 93; Wt. Ic. t. 1941.

W. Ghâts, Coorg and Nilgiris southwards, in evergreen forest and Shola, 1,500-7,000 ft.

A slender climber similar to the last (in some cases more slender) and difficult sometimes to separate from it, for crisped hairs occur to some extent in this and white scales may sometimes be found in that as also in *P. Wightii*. Berries globose, ·2–·3 in. in diam. A small-leaved form (var. 2 or var. 5 of the F. B. I.) may perhaps have to be separated when better known.

12. PIPER ATTENUATUM, Buch.-Ham.; F. B. I. v. 92; Wt. Ic. t. 1933. *P. sylvestre*, Wt. Ic. t. 1937; F. B. I. v. 93, *P. trioicum*, Roxb.; Wt. Ic. tt. 1935, 1936.

N. Circars, forests of the hills of Vizagapatam and Godavari at 2,000–3,000 ft.; W. Ghâts, Malabar and Nilgiris to Travancore and Tinnevelly, in evergreen forests at low levels.

A slender climber with often somewhat zigzag branchlets and ovate-cordate leaves, the berries globose, very small. This seems to be the Circar species which Roxburgh cultivated at Samulcotta as true pepper.

13. PIPER WIGHTII, Miq.; F. B. I. v. 94; Wt. Ic. t. 1939.

W. Ghâts, Nilgiris and Pulneys, above 6,000 ft., in Shola forests.

A stout climber with smooth stems, at first rooting ivy-like on trees and with small cordate leaves, later branching out and spreading, the leaves rather variable but always

prominently reticulate, the berries small with prominent stigmas. White scales, as in *P. argyrophyllum*, are often found on the under-surface of the leaves, but this is a much stouter plant.

P. Betle, Linn., is the Betel pepper, a perennial Malay creeper extensively cultivated in hot damp localities for its leaves (Pán) which are rolled up with portions of areca nut, lime, catechu, cardamoms and other ingredients, sold in shops and universally chewed. The plants are cultivated in special trellised gardens.

2. Heckeria, Kunth.

Shrubs, usually with succulent branches. *Leaves* large, long-petioled, orbicular or peltate, cordate at base, the petiole sheathing. *Flowers* very minute, hermaphrodite, in very close slender cylindrical spikes in pedunculate umbels in the axils of the leaves; bracts pedicelled, peltate. *Perianth* 0. *Stamens* 2–3, at the base of the ovary; anthers very small, 4-valvate. *Ovary* free; stigmas 3. *Fruit* a very small indehiscent, usually trigonous berry. *Seeds* adherent to the pericarp; albumen floury.

HECKERIA SUBPELTATA, Kunth. *Piper subpeltatum*, Willd.; F. B. I. v. 95. *Pothomorphe subpeltata*, Miq.; Wt. Ic. t. 1925.

W Ghâts, in all Districts, in evergreen forests, up to 3,000 ft.

A large herbaceous shrub, often 3–5 ft. high with orbicular acute, deeply cordate leaves palmately nerved and reticulate, up to 12 in. in diam., the spikes often 5–6 in. long, 3–7 together in the umbel, the fruits trigonous.

3. Peperomia, Ruiz & Pav.

Annual or perennial usually succulent herbs. *Leaves* alternate, opposite or whorled, entire, pellucid-punctate; stipules 0. *Flowers* minute, hermaphrodite, sessile or sunk in the rhachis, erect, in terminal or leaf-opposed, solitary or panicled, rarely axillary spikes; bracts sessile, often peltately attached. *Perianth* 0. *Stamens* 2; filaments very short; anther-cells confluent. *Ovary* 1-celled, obtuse acute or beaked; ovule solitary, erect; stigma lateral or terminal, usually penicillate. *Fruit* a minute, indehiscent, almost dry nutlet, the pericarp very thin. *Seed* minute, testa membranous; albumen floury.

Leaves [illegible]us, small, ·2–·3 in. in diam., rarely more, pale when dry, the ribs and nerves invisible :—

Leaves in whorls of 4, orbicular, nearly sessile, glabrous ; spikes stout, ·75–1·5 in. long, with pubescent rhachis, the peduncles about ·5–·75 in. long, the nutlets ovoid, acute.....1. *reflexa.*

Leaves opposite or alternate, obtuse or emarginate, with slender petiole ·2 in. long, minutely puberulous ; spikes slender, ·75 in. long, with glabrous rhachis, the peduncles scarcely ·25 in. long, the nutlets ellipsoid.....2. *Heyneana.*

Leaves fleshy, opposite or alternate or both, the ribs and sometimes nerves visible :—

Leaves and stems glabrous or very nearly so :—

Leaves mostly alternate, prominently 5-ribbed from the base, elliptic-ovate, acute, cuneate at base, up to 3·5 in. long, 2 in. broad, the petiole to ·75 in. ; spikes very slender, up to 4 in. long, the peduncle to 1 in., the nutlets globose, scurfy and black-punctate.....3. *Thomsoni.*

Leaves mostly opposite or the upper whorled, lower ones often alternate, 3-ribbed :—

Leaves obovate, obtuse or emarginate, cuneate at base, up to 1·5 in. long, 1 in. broad, the petiole ·2–·5 in. ; spikes rather stout, up to 2 in. long, the peduncle to 1 in., the nutlets ovoid, minutely scaly.....4. *portulacoides.*

Leaves elliptic orbicular or obovate, obtuse, rounded at base, up to ·75 in. in diam., the petiole to ·25 in., the side ribs very obscure ; spikes slender, up to 2 in. long, the peduncle short, the nutlets ovoid, minutely rugose and scurfy....5. *Wightiana.*

Leaves and stems pubescent with crisped hairs, leaves usually opposite, 3–5-ribbed from the base, but rather obscurely, elliptic-ovate or -obovate, rounded or slightly acute, up to 1·5 in. long, 1 in. broad, petiole to ·5 in. ; spikes slender, often in terminal panicles, up to 4 in. long, the peduncle ·75 in., the nutlets globose, punctate .....6. *dindigulensis.*

Leaves very thin, membranous when dry, broadly ovate-deltoid, acute, 5–7-ribbed, opposite and alternate, about 1 in. in diam. ; spikes very slender, opposite the leaves, the nutlets ribbed and reticulate.....7. *pellucida.*

1. PEPEROMIA REFLEXA, A. Dietr. ; F. B. I. v. 99 ; Wt. Ic. t. 1923. 1.

N. Circars, in Ganjam and up to 4,000 ft. on Mahendragiri ; W. Ghâts, in all Districts from the Coimbatore Hills and Nilgiris southwards, usually above 4,000 ft.

A succulent tufted herb growing epiphytically on tree-trunks.

2. PEPEROMIA HEYNEANA, Miq.; F. B. I. v. 99.
Bababudan Hills of Mysore, at 6,000 ft. (Meebold), Ootacamund in Nilgiris (G. King).
A small epiphytic herb with emarginate leaves, sometimes up to 1 in. long, but usually much smaller.

3. PEPEROMIA THOMSONI, Hook. f.; F. B. I. v. 97. *P. dindigulensis*, Wt. Ic. t. 1921, *not* of Miq. (not good).
W. Ghâts, Anamalai and Pulney Hills, at rather low levels.
A large-leaved (comparatively) succulent epiphyte rooting in moss on the branches of trees.

4. PEPEROMIA PORTULACOIDES, A. Dietr.; F. B. I. v. 98; Wt. Ic. t. 1922, 2. *P. courtallensis*, Miq.; Wt. Ic. t. 1923, 2.
W. Ghâts, hills of Tinnevelly and Travancore, Avalanché in Nilgiris, probably over 5,000 ft.
An erect glabrous succulent herb, growing on rocks and tree-trunks.

5. PEPEROMIA WIGHTIANA, Miq.; F. B. I. v. 98; Wt. Ic. t. 1924 (except pubescence).
W. Ghâts, Nilgiris and Pulneys above 4,000 ft.
A small slender succulent herb, growing on moist rocks and on the branches of trees. The tips of the leaves are sometimes ciliate.

6. PEPEROMIA DINDIGULENSIS, Miq.; F. B. I. v. 98. *P. Heyneana*, Wt. Ic. t. 1922, 1, *not* of Miq.
N. Circars, Bison Hill, Godavari (Barber); Carnatic, Shevaroy Hills of Salem, Kollimalai Hills of Trichinopoly; W. Ghâts, from Malabar southwards at about 2,000–4,000 ft.
An erect, rather large, succulent herb, growing on moist rocks or on tree branches, conspicuous by its pubescence.

7. PEPEROMIA PELLUCIDA, H. B. & K.
Madras, a weed in gardens; W. Coast, at Trevandrum, introduced and clearly run wild, a native of S. America.
A slender succulent herb with weak procumbent stems.

Family CXXIV. CHLORANTHACEAE.

Herbs, shrubs or trees, usually aromatic. *Leaves* opposite, usually toothed, the petioles often connate in a sheath; stipules

small, subulate, usually on the margin of the sheath. *Flowers* in terminal or pseudo-axillary spikes heads or panicles, unisexual or hermaphrodite from the ♂ and ♀ cohering supported by a bract; ♂ flowers without perianth, ♀ also or with a 3-toothed limb adnate to the ovary. *Stamens* 1 or 3, connate; filaments very short and thick; anthers 2-celled, or if 3, side ones 1-celled. *Ovary* 1-celled; ovule 1, orthotropous, pendulous; style very short. *Fruit* a small, ovoid or globose, drupe, exocarp fleshy, endocarp crustaceous. *Seed* pendulous; testa membranous; albumen copious, fleshy; embryo minute; cotyledons divaricate or scarcely distinct; radicle inferior.

1. Chloranthus, Swartz.

Perennial herbs or shrubs, the stems articulate at the nodes. *Flowers* in terminal simple or panicled spikes, hermaphrodite, the ♂ and ♀ connate on a bract; perianth 0. *Stamens* 1 or 3 confluent; if 3 the central anther 2-celled, the side ones 1-celled. *Ovary* with subsessile truncate stigma.

CHLORANTHUS BRACHYSTACHYS, Blume; F. B. I. v. 100. *Sarcandra chloranthoides*, Gardn.; Wt. Ic. t. 1946.

W Ghâts, hills of Malabar, Bolumpatti Valley, Anamalais, Pulneys and Tinnevelly at 2,000–5,000 ft., in moist forests.

A small bush reaching 4 ft. in height, the lanceolate leaves coarsely spinous-serrate, reaching 7 in. long, the single stamen with large thickened connective and filament, the berries globose, purplish-black.

Family CXXV. MYRISTICACEAE.

Evergreen tree, often stellately tomentose. *Leaves* alternate, entire, often pellucid-punctate; stipules 0. *Flowers* small, dioecious, regular, in axillary or lateral panicles cymes umbels or fascicles, rarely in racemes; bracteoles persistent or caducous. *Perianth* gamophyllous, inferior, with 3, sometimes 2 or 4, lobes valvate in bud. *Androecium* in ♂ flowers of 3 or more extrorse anthers connate in a sessile or stipitate column, ring or disk; anthers 2-celled, linear or ovate. *Ovary* in ♀ flowers superior, free, 1-celled; ovule 1 basal, erect, anatropous; stigma capitate discoid or lobed. *Fruit* more or less fleshy, splitting usually into 2, rarely 4, valves. *Seed* erect, enclosed in a thin or fleshy, entire or lacerate, coloured, often aromatic arillus; testa usually thick.

albumen copious, hard, ruminate; embryo very small, basal; cotyledons divaricate, flat or crumpled; radicle short, inferior.

Anthers attached by their backs to a column formed of the connate filaments :—

Anther-column sessile, the apices of the anthers free ..... 1. **Gymnacranthera.**

Anther-column stipitate and usually produced beyond the anthers which are completely attached to it ..... 2. **Myristica.**

Anthers attached by their bases stellately to a peltate usually stipitate column formed of the connate filaments ..... 3. **Knema.**

1. Gymnacranthera, Warb.

Trees. *Leaves* alternate, entire, evergreen, pergamaceous. *Flowers* small, dioecious, ♂ in fascicles in axillary panicles, ♀ in short axillary racemes, bracts deciduous. *Perianth* 3–4-lobed. *Androecium* sessile, the connectives combined in an oblong t ick column; anthers 6–12, elongate, the lower parts adnate to the column by their backs, the apices free, often inflexed over the column. *Ovary* ovoid; stigmas sessile, connate, scarcely bilobed. *Fruit* globose or ovoid; pericarp thick, fleshy; arillus laciniate almost to the base. *Seed* conforms to the fruit; testa woody; albumen ruminate; cotyledons divaricate, connate at base.

GYMNACRANTHERA CANARICA, Warb. **Monog. Myrist.** 368. *Myristica canarica*, King, Ann. Calc. iii. 307, t. 138. *M. Farquhariana*, Wall.; F. B. I. v. 108 *in part*; **Bedd. Fl. t. 270.**

W. Ghâts, from S. Canara southwards to Travancore, in evergreen forests at low levels about 1,000 ft. alt.

A very large evergreen tree with oblong leaves up to 10 in. long, 4 in. broad, glaucous beneath. The fruit is globose about 1 in. in diam. Bark smooth, brown; wood yellowish-grey, coarse, moderately hard, of little value. The seeds can be used in the making of candles, as they contain much fat. Vern. *Kan.* Pindi; *Mal.* Undai pánu.

2. Myristica, Linn.

Trees. *Leaves* alternate, entire, evergreen, pergamaceous or chartaceous. *Flowers* small, dioecious, in cymes umbels or fascicles, from the axils of the leaves or of the scars of fallen leaves, the peduncles usually thick; bracts deciduous; bracteoles persistent, usually oblique, at the base of the perianth. *Perianth*

3-lobed. *Androecium* stalked, the filaments and connectives connate in a column usually produced beyond the anthers; anthers 12–30 elongate. *Ovary* ovoid; stigmas connate, 2-lobed. *Fruit* large, ovoid or oblong; pericarp thick, succulent, rarely leathery; arillus laciniate. *Seed* conform to the fruit; testa hard; albumen ruminate; cotyledons connate.

Flowers urceolate in panicled cymes, the peduncles slender; ♀ larger than ♂; leaves rather thin :—

Cymes few-flowered, at most 3–5 in ♂, fewer in ♀; perianth ·2–·3 in. long, tawny-villous, the pedicels drooping, about ·5 in. long; leaves elliptic-lanceolate, acuminate, 3–5 in. long, 1·5–2 in. broad, subglaucous beneath, nerves about 8 pairs; fruit broadly pyriform, up to 2 in. long, the pericarp yellow, the arillus red and much laciniate ..... *fragrans.*

Cymes dichasioid, up to 20 in ♂ flowers, only 3 or 4 in ♀; perianth ·2–·25 in. long, subglabrous, the pedicels about ·25 in. long; leaves elliptic-oblong, subobtuse, 3–7 in. long, 1–3 in. broad, brown beneath, nerves about 10 pairs; fruit cylindrical, 2–3 in. long, ·75 in. broad, villous, the arillus yellow ..... 1. *malabarica.*

Flowers ovoid, in short cymes or fascicles on thick woody peduncles; leaves thick and large with prominent nerves :—

Leaves beneath densely reddish tomentose, smooth and glabrous above, oblong or elliptic-oblong, acute at apex, rounded at base, 12–24 in. long, 4–6 in. broad, main nerves 20–26 pairs, impressed above, petiole stout, ·5–1 in. long, channelled; flowers rather small, densely rusty tomentose, ♀ slightly larger but less numerous than ♂; fruit oblong up to 4 in. long, densely tomentose, the arillus orange-red and deeply much laciniate ..... 2. *magnifica.*

Leaves beneath glabrous and usually glaucous, smooth above :—

Leaf nerves and transverse nervules conspicuous, leaves 5–10 in. long, 2·5–4 in. broad; fruit globose, 2–2·5 in. in diam., the pericarp fleshy, the laciniae of the orange-red arillus with their ends separate ..... 3. *Beddomei.*

Leaf nerves only conspicuous, the rest faint, leaves oblong lanceolate up to 10 in. long, 4 in. broad; fruit lanceolate, 1·5–2·5 in. long, the pericarp fleshy, the laciniae of the arillus drawn together at their tips ..... 4. *contorta.*

1. **Myristica malabarica**, Lamk.; F. B. I. v. 103; Bedd. Fl. t. 269; King Ann. Calc. t. 109; Warb. Monog. Myrist. t. xii. 1.

W. Ghâts, in evergreen forests from S. Canara southwards, at low levels up to 1,000 ft.

A tree reaching 50 ft. in height and a diam. of 1·5 ft. Bark greenish-black, smooth; wood yellowish-brown tinged with grey, moderately hard, not durable and of little use. Vern. *Kan.* Kanagi; *Tam.* Patthiri; *Mal.* Ponnam pánu.

2. MYRISTICA MAGNIFICA, Bedd. Fl. t. 268; F. B. I. v. 104; King Ann. Calc. t. 119

W. Ghâts, Travancore and parts of Tinnevelly and Canara (Bourdillon), especially common about Kolaturpoli, in swampy ground in evergreen forests.

A lofty tree reaching 90–100 ft. in height (Cooke), 120 ft. (Bourdillon), often buttressed and furnished with numerous aërial roots, which start from the trunk at 10–20 ft. above ground and spread along the ground, rising in loops above it. Bark purplish-black, smooth; wood yellowish-white, soft and perishable. Vern. *Mal.* Kottha pánu.

3. MYRISTICA BEDDOMEI, King Ann. Calc. 291, t. 118. *M. laurifolia*, Hook. f. & Th., var. *lanceolata*, Hook. f.; F. B. I. v. 103. *M. laurifolia*, Bedd. Ic. t. 267 *fruit only* (flowering branch is probably *M. malabarica*).

W. Ghâts, in all Districts, in evergreen forests, up to 5,000 ft. Wild Nutmeg.

A large tree reaching 90 ft. in height, with a diameter of about 2·5 ft. Bark blackish-green, rather smooth; wood yellowish brown, moderately hard, perishable and of no great value. Vern. *Kan.* Jajikai; *Mar.* Jayaphal; *Tam.* Kathu jathikai; *Mal.* Pattha pánu.

4. MYRISTICA CONTORTA, Warb. Monog. Myrist. 507, t. 16 *part*.

W. Ghâts in S. Canara and Malabar up to 3,000 ft., in evergreen forest; Lower Pulneys (Bourne).

A large tree, apparently only really separable from *M. Beddomei* by the fruit, and quite doubtfully distinct from it.

M. fragrans, Houtt., is the Nutmeg tree, native of the E. Moluccas and cultivated more or less throughout Malaya. In India it is only found as a specimen tree in a few localities, chiefly Botanic Gardens like Barliyar, where the climate is sufficiently hot and moist. The "nutmeg" is given by the large seed, and the arillus outside it gives the spice known as "mace."

3. Knema, Lour.

Trees. *Leaves* alternate, evergreen, coriaceous or chartaceous. *Flowers* small, dioecious, ♂ in fascicles on thick peduncles from the axils of leaves or of the scars of fallen leaves, ♀ similar but fewer and rather longer; bracts deciduous; pedicels bracteolate. *Perianth* 3-lobed. *Androecium* usually stalked; filaments and connectives connate in a peltate disk; anthers 8–20, free, attached stellately to the margin of the disk, dehiscing downwards. *Ovary* ovoid; style short, thick; stigmas 2, laciniate on the margins. *Fruit* ovoid or oblong; pericarp thick, fleshy, tomentose; arillus laciniate at the apex only. *Seed* conform to the fruit; albumen ruminate; cotyledons divaricate or suberect.

KNEMA ATTENUATA, Warb. *Myristica attenuata*, Wall.; F. B. I. v. 110; King Ann. Calc. t. 152. *M. corticosa*, Bedd. Fl. t. 271, *not of* Lour.

W. Ghâts, from S. Canara southwards, in evergreen forests up to 2,000 ft.

A moderate-sized tree with oblong-lanceolate acuminate leaves up to 8 in. long, 2–3 in. broad, prominently and regularly nerved, glaucous and rusty pubescent beneath, the flowers stellately pubescent, the fruit ovoid, 1·5 in. long, the aril of a brilliant crimson. Bark greenish-black, smooth; wood pale brown, moderately hard, of little value. Vern. *Kan.* Rukt maru; *Tam.* Chora patthiri; *Mal.* Chora panu.

Family CXXVI. LAURACEAE.

Erect aromatic trees or shrubs, or (*Cassytha*) leafless twining parasites, usually evergreen. *Leaves* alternate, rarely opposite or subopposite, entire, stipules 0. *Flowers* regular, small hermaphrodite or dioecious, in axillary or lateral cymes clusters racemes or panicles, sometimes in umbellules; bracts deciduous, often involucrate, sometimes 0. *Perianth* usually inferior; tube short, often enlarging in fruit; lobes usually 6, sometimes more, sometimes only 4, in 2 series, equal or unequal, deciduous or persistent in fruit, sometimes enlarged as are the pedicels. *Stamens* usually a multiple of the perianth-lobes, in 2–4 series on the tube; filaments of the inner rows usually, of the outer sometimes with a pair of glands attached or alongside; anthers

erect, 2–4-celled, the cells dehiscing by upcurved, at length deciduous, valvular lids, the 4th row of stamens often reduced to glands: in ♀ flowers the stamens replaced by staminodes, usually linear or clavate, the inner biglandular as in ♂. *Ovary* sessile at the base of the perianth-tube, 1-celled; ovule solitary, anatropous, pendulous from the top of the cell. *Fruit* a dry or fleshy berry or drupe, naked or enclosed in the perianth-tube or supported by the more or less enlarged perianth-tube and lobes, the pedicel frequently thickened. *Seed* pendulous; testa membranous; albumen 0; cotyledons plano-convex, fleshy; radicle minute, superior.

Trees or shrubs :—

Stamens of 3rd row, when present, with extrorse anthers :—

Anthers 2-celled :—

Fruit surrounded by the enlarged perianth-tube **1. Cryptocarya.**

Fruit not surrounded by the enlarged perianth-tube :—

Fruiting perianth persistent .....2. **Apollonias.**

Fruiting perianth deciduous .....3. **Beilschmiedia.**

Anthers 4-celled :—

Leaves opposite or subopposite rarely alternate, usually 3- or more-ribbed; fruiting perianth enlarged into a cupule embracing the fruit .....4. **Cinnamomum.**

Leaves alternate :—

Fruiting perianth-tube enlarged, fruiting pedicels enlarged, thick and usually warted .....5. **Alseodaphne.**

Fruiting perianth-tube and pedicels hardly enlarged :—

Fruiting perianth-lobes reflexed .....6. **Machilus.**

Fruiting perianth-lobes erect, cup-like.....7. **Phoebe.**

Stamens of all rows with introrse anthers, the lower cells sometimes lateral :—

Fertile stamens 9; involucral bracts deciduous in flower; leaves usually subverticillate, 3-ribbed or 1-ribbed, penninerved 8. **Actinodaphne.**

Fertile stamens normally 9 or 12, frequently more, rarely less; involucral bracts persistent in flower; leaves alternate or subopposite, penninerved .....9. **Litsea.**

Fertile stamens 6; involucral bracts early deciduous; leaves alternate or subverticillate, 3-ribbed .....10. **Neolitsea.**

Leafless filiform twining parasites with suckers; stamens with 4-celled anthers, outer two rows introrse, inner row extrorse ....11. **Cassytha.**

1. Cryptocarya, R. Br.

Evergreen trees or shrubs. *Leaves* usually alternate, penni-nerved or 3-ribbed, more or less coriaceous. *Flowers* small, hermaphrodite, in axillary or subterminal pedunculate panicles; bracts and bracteoles present but often early caducous. *Perianth*-tube turbinate or ovoid, ultimately narrowed at the top; lobes 6, in two rows, subequal. *Stamens* 9 perfect, those of the 1st row introrse opposite the 3 outer perianth lobes, those of the 2nd row introrse opposite the 3 inner lobes, within and alternate with the stamens, 6 stipitate glands, then those of the 3rd row extrorse opposite the stamens of the 1st row, then, slightly within these, 3 stipitate cordate staminodes opposite the stamens of the 2nd row; all stamens 2-celled, the connective often produced. *Ovary* sessile at the bottom of the perianth-tube and enclosed in it; style shortly exserted; stigma obtuse or capitate. *Fruit* drupaceous, hardened or fleshy, smooth or ribbed, enclosed in the accrescent perianth-tube; pericarp membranous or thinly crustaceous, more or less free from the perianth-tube. *Seed* with a membranous testa, often not separable from the pericarp; cotyledons thick, fleshy; radicle minute.

Leaves beneath with prominent nerves and transverse nervules, all fulvous-tomentose, the reticulation also villous, elliptic-obovate, abruptly sharp-acuminate, up to 8 in. long, 4 in. broad; flowers in short axillary fulvous panicles of cymes with prominent bracts and bracteoles, apparently persistent ..... 1. *anamalayana.*

Leaves beneath glabrous except sometimes the midrib and nerves; bracts and bracteoles deciduous :—

Flowers in spreading terminal or axillary panicles :—

Leaves ovate or elliptic, obtuse or suddenly shortly acute at apex, rounded or even truncate at base, shining above, reddish-glaucous beneath, the nerves distant, impressed above, the transverse nervules also distant but distinct, reticulation not dotted-areolate, up to 5 in. long, 2·5 in. broad; panicles usually axillary, fulvous-pubescent, up to 5 in. long ..... 2. *Beddomei.*

Leaves elliptic or elliptic-oblong, glaucous beneath, the nerves prominent beneath, the transverse nervules indistinct, the reticulation dotted-areolate :—

Main nerves 9–12 pairs, leaf-apex abruptly and obtusely acuminate, base rounded, up to 9 in. long, 4 in. broad; berry globose, ·5 in. in diam., dull and smooth ..... 3. *Bourdillonii.*

Main nerves 6–8 pairs, leaf-apex obtuse or emarginate, sometimes slightly acute, base acute, 3–5 in. long, 1–2 in. broad; berry ovoid, 1·5 in. long, ·75 in. broad, furrowed and often lenticellate ..... 4. *Lawsoni.*

Flowers in short congested axillary or terminal tawny-tomentose panicles :—

Leaves elliptic- or ovate-oblong, obtuse or slightly acute at apex, rounded at base, smooth and dull above, glaucous beneath and reticulate, the nerves 5–7 pairs often pubescent; up to 4 in. long, 2·25 in. broad; berry ovoid, black, ·5 in. long 5. *neilgherrensis.*

Leaves ovate obovate or oblong, sometimes almost orbicular, obtuse or emarginate at apex, obtuse at base, shining above, subglaucous beneath, the transverse nervules prominent, the nerves 5–8 pairs; sometimes tomentose, up to 4 in. long, 2·5 in. broad; berry oblong, 1 in. long, ·3–·4 in. broad, smooth 6. *Stocksii.*

1. CRYPTOCARYA ANAMALAYANA, Gamble in Kew Bull. 1925, 126. *C. sp.*; F. B. I. v. 121.

   W. Ghâts, Anamalai Hills, at 3,000 ft. (Bedd., Barber).

   A tree with rather thin leaves with prominent transverse nervules and fulvous tomentose branchlets and inflorescence.

2. CRYPTOCARYA BEDDOMEI, Gamble in Kew Bull. 1925, 127.

   W. Ghats, S. Canara plains (Beddome); Udumanparai in Anamalais (Barber).

   A tree with coriaceous leaves.

3. CRYPTOCARYA BOURDILLONII, Gamble in Kew Bull. 1925, 127. *C. Wightiana*, Hook. f.; F. B. I. iv. 120 *in part, not of* Thw.

   W. Ghâts, Kolaturpoli, Travancore, up to 500 ft. in evergreen wet forest (Bourdillon), S. Tinnevelly (Beddome).

   A tall tree, probably in part *C. Wightiana*, Bourd. Trav. Trees 296. The main nerves are smooth or slightly raised above, the midrib impressed, the transverse nervules subparallel. In young shoots the leaves may reach a large size, more than 12 in. long and 6 in. broad, with a thick petiole of 2 in.

4. CRYPTOCARYA LAWSONI, Gamble in Kew Bull. 1925, 127.

   W. Ghâts, Kundahs Sholas in Nilgiris above 5,000 ft.

(Lawson, Gamble); hills of Tinnevelly (Beddome, Tadulingam).

A lofty tree in Tinnevelly (Beddome); in Nilgiris a stout not very tall one. The main nerves are short and curved, smooth above, the midrib impressed, the transverse nervules merged in the reticulation.

5. CRYPTOCARYA NEILGHERRENSIS, Meissn. *C. Stocksii*, Hook. f.; F. B. I. v. 120 *in part, not of* Meissn.

W. Ghâts, Nilgiris at about 6,000 ft. (Wight, Gamble), Anamalais at 2,500 ft. (Beddome), in Shola forest.

A large tree (Beddome). The midrib and main nerves of the leaves are impressed above, the branchlets tawny-pubescent and lenticellate.

6. CRYPTOCARYA STOCKSII, Meissn.; F. B. I. v. 120 *in part.*

W. Ghâts, Canara to the Pulneys, Anamalais and hills of Travancore at about 4,000–5,000 ft.; Bababudan Hills of Mysore (Talbot).

A large or medium-sized tree with very coriaceous leaves and prominently lenticellate branches. The midrib and main nerves are much impressed above, and the margins often reflexed, the branchlets prominently lenticellate.

2. Apollonias, Nees.

Evergreen trees. *Leaves* scattered, chiefly near the ends of the branchlets, penninerved. *Flowers* very small, hermaphrodite, in axillary or subterminal racemes, the peduncles and pedicels slender. *Perianth*-tube short; lobes 6, in two rows, subequal. *Stamens* 9 perfect, those of the 1st and 2nd rows introrse, opposite the perianth-lobes, those of the 3rd row opposite the first and extrorse, with a pair of stalked glands at their bases, those of the 4th row reduced to ovate or cordate staminodes, all stamens 2-celled only. *Ovary* sessile, stigma depressed-capitate. *Fruit* drupaceous, globose or ovoid, seated on the slightly enlarged perianth lobes.

APOLLONIAS ARNOTTII, Nees; F. B. I. v. 121; Wt. Ic. t. 1819; Bedd. Fl. t. 291.

W. Ghâts, forests of Tinnevelly and Travancore (Wight, Barber, Lawson); Nilgiris (Gardner), in evergreen forest, at 2,500–5,000 ft., rare.

A moderate-sized tree with narrowly lanceolate long acuminate leaves, similar to those of *Phoebe lanceolata*, which has 4-celled anthers and stouter peduncles and pedicels. Vern. *Mal.* Chenthanam.

3. Beilschmiedia, Nees.

Evergreen trees or shrubs. *Leaves* alternate or opposite, usually coriaceous, penni-nerved, venose-reticulate. *Flowers* small, hermaphrodite, axillary lateral or subterminal, in racemes or panicles. *Perianth*-tube short; lobes 6, subequal, deciduous. *Stamens* 9 perfect, those of the 1st and 2nd rows introrse, those of the 3rd row extrorse, staminodes of the 4th row cordate or ovoid, stipitate; glands 6, stipitate, nearly as large as the staminodes, between the 2nd and 3rd row of stamens; all anthers 2-celled. *Ovary* sessile, free from the perianth, attenuate into the style; stigma obtuse. *Fruit* an oblong ovoid or globose berry, the pedicels not or only slightly thickened. *Seed* with a membranous testa; cotyledons fleshy, often with a rudimentary dissepiment, sometimes ruminate.

Leaf buds small, pubescent, without coriaceous scales :—

Ovary glabrous; leaves usually alternate, elliptic- or oblong-lanceolate, obtuse or bluntly acuminate, cuneate at base, shining above, main nerves about 8–12 pairs, joined by a prominent areolate reticulation, up to 7 in. long, 2·5 in. broad; racemes axillary or lateral, pubescent, under 1 in. long, the bracts narrow, deciduous; berry oblong-obovoid up to 1–1·5 in. long .....1. *Roxburghiana.*

Ovary villous, leaves usually opposite, ovate lanceolate, obtusely acute, attenuate at base, dull above and below, main nerves 6–10 pairs, irregular, joined by a not very prominent reticulation, up to 7 in. long, 1·5–3 in. broad; racemes axillary and terminal, fulvous-villous, about 1 in. long and with prominent concave silky deciduous bracts; berry purple, cylindric, 1–1·5 in long, ·75 in. in diam., the peduncle red .....2. *Bourdilloni.*

Leaf-buds elongate, perulate, the scales lanceolate; leaves usually opposite, elliptic-lanceolate, obtusely acute or acuminate, acute at base, shining, glabrous, main nerves 10–12, the reticulation prominent, raised and areolate, up to 6 in. long, 2·5 in. broad; panicles axillary and terminal, with slender peduncles and pedicels, not bracteate; berry ovoid, up to 1·25 in. long, in diam. ·7 in. smooth, purple

3. *Wightii.*

1. BEILSCHMIEDIA ROXBURGHIANA, Nees; F. B. I. v. 121; Wt. Ic. t. 1828.

   N. Circars, hills of E. Ghâts on Mahendragiri, the Palkondas and in Rampa, from Ganjam to the Godavari, at 1,500–4,000 ft. (Gamble).

   A large or moderate-sized tree with coriaceous leaves, the nerves and reticulation all prettily raised on the upper surface. Wood white, moderately hard, even-grained. Vern. *Hind.* Konhaia.

2. BEILSCHMIEDIA BOURDILLONI, Brandis Ind. Trees 528. *B. fagifolia*, Bedd. Fl. t. 263, *not of* Nees.

   W. Ghâts, S. Canara to Travancore, in evergreen forests up to 1,500 ft.

   A large tree, the rather soft leaves both opposite and alternate. Bark dark green; wood pale brown, hard and heavy, but not used. Vern. *Mal.* Mora Kutthi.

3. BEILSCHMIEDIA WIGHTII, Benth.; F. B. I. v. 124. *Haasia Wightii*, Nees; Wt. Ic. t. 1831; Bedd. Fl. t. 298.

   W. Ghâts, Anamalais, Pulneys and hills of Travancore, up to 4,000 ft. in evergreen forests.

   A large tree with characteristic perulate buds and flowers in panicles 4 in. long, the ovary glabrous. Bark brown, rough; wood hard, greyish-white with a silvery grain.

4. Cinnamomum, Blume.

Evergreen trees or shrubs, usually with aromatic bark. *Leaves* opposite or sometimes alternate, usually ribbed from near the base. *Flowers* small, hermaphrodite, in axillary lateral or subterminal cymes or panicles, in the latter case the branches usually ending in dichasia with the middle flower largest. *Perianth*-tube short, funnel-shaped, enlarged in fruit; lobes 6, subequal, persistent or partly truncate or deciduous in fruit. *Stamens* 9 perfect, those of the 1st and 2nd rows opposite the perianth-lobes introrse and eglandular, those of the 3rd row opposite the 1st row extrorse and bearing on the filaments 2 usually stipitate glands; staminodes of the 4th row opposite the 2nd row usually cordate and stipitate; anthers 4-celled. *Ovary* sessile at the bottom of the perianth-tube, narrowed into the rather thick style; stigma discoid or obscurely 3-lobed. *Fruit* a berry seated on the usually cup-shaped enlarged perianth-tube,

the lobes persistent deciduous or sometimes truncate near their middle. *Seed* conform to the fruit; testa membranous; cotyledons fleshy.

Leaves opposite or only sometimes alternate :—

Flowers few only, axillary, peduncles and pedicels slender, usually long :—

Flowers very small, under ·1 in. long, glabrous, as are the stamens and ovary, in dichasioid cymes; stamens minute ,the filaments very short; leaves elliptic-ovate or -lanceolate, obtusely acuminate, 3-ribbed from about ·2 in. above the base, minutely reticulate with many horizontal transverse nervules, up to 5 in. long, 2 in. broad .....1. *gracile.*

Flowers small, ·15 in. long, grey-pubescent, in subumbellate cymes, the filaments villous; leaves linear-lanceolate, acuminate, acute at base, 3-ribbed from the base, glabrous, up to 4 in. long, 1·25 in. broad, but usually much narrower .....2. *riparium.*

Flowers ·2 in. long, fulvous-tomentose, in rather short fulvous racemes, often reduced to threes, the filaments villous; leaves ovate, acute or acuminate, acute at base, 3-ribbed from about ·2 in. above the base, tawny villous beneath when young, sparsely so when old, up to 3 in. long, 1·4 in. broad.....3. *travancoricum.*

Flowers many, in axillary or terminal panicles :—

Leaves glabrous :—

Panicles long, many-branched, with long peduncles and pedicels, the flower-buds globose, grey-pubescent, perianth ·1–·2 in. long :—

Leaves large, oblong or elliptic-oblong or oblong-lanceolate, acute or acuminate, often sphacelate, 3-ribbed from at or a little above the base, the side ribs running almost to the apex, the transverse nervules horizontal and parallel, up to 18 in. long, 4·5 in. broad.....4. *iners.*

Leaves moderate-sized, ovate or elliptic-ovate or ovate lanceolate, shining above :—

Leaves 3–5-ribbed from a little above the base, the chief side ribs ending about three-fourths up, nervules irregularly reticulate, the base usually rounded, up to 6 in. long, 3 in. broad .....5. *zeylanicum.*

Leaves 3–5-ribbed from about ·3 in. above the base, ovate, obtuse at apex, attenuate at base into the long petiole, the ribs faint, the side ones ending about half-way up, nervules obscure, but 2–3 pairs of faint nerves from the midrib .....6. *litseaefolium.*

Panicles short and compact, but long-peduncled, up to about 3 in. in length, fulvous tomentose, pedicels short, perianth ·25 in. long; leaves broadly ovate, obtuse or acute, rounded or acute at base, often glaucous beneath, 3–5- sometimes 7-ribbed from ·3 to ·5 in. above the base, a few nerves both from the midrib and side ribs, reticulation areolate; up to 4 in. long, 3·5 in. broad .....7. *Wightii.*

Panicles long-peduncled, but comparatively few-flowered, up to 5 in. long in all, the flowers elongate, with the thickened perianth up to ·5 in. long; leaves elliptic-ovate or oblong, obtuse, narrowed at base into the broad petiole, 3–5-ribbed, the 3 inner from nearly ·5–1 in. above the base, reaching nearly to the apex, the middle two with nerves; up to nearly 9 in. long, 2·5–3·5 in. broad .....8. *macrocarpum.*

Leaves hairy, at any rate on the under surface :—

Flowers small, ·2 in. long with pedicels, the buds globose, yellowish-tawny tomentose, in panicles up to 4 in. long; leaves elliptic-oblong or ovate-lanceolate, acute or acuminate, 3-nerved from at or a little above the base and the side ribs nearly to the apex, when young glaucous and yellowish-pubescent beneath, afterwards glabrous; up to 7 in. long, 2·5 in. broad, but mature leaves usually much smaller

9. *sulphuratum.*

Flowers rather large, ·3 in. long, usually in threes on the branches of densely fulvous-tomentose panicles 1–4 in. long; leaves also when young densely fulvous-tomentose on both sides, less so when old, opposite or alternate, ovate or oblong, sometimes lanceolate or even orbicular, obtuse or acute, 3–5-ribbed from near the base, the side ribs to the apex, often joined to the centre ones by nerves; up to 5 in. long, 2 in. broad

10. *Perrottetii.*

Leaves all alternate, thinly coriaceous, ovate or orbicular, caudate-acuminate, acute or rounded at base, glabrous, 3–5-ribbed, the side ribs prolonged to the apex, 3–5 in. long, 1·5–3 in. broad, shortly petioled; flowers minute, in short axillary pedunculate pubescent cymes about 1 in. long .....11. *caudatum.*

1. CINNAMOMUM GRACILE, Hook. f.; F. B. I. v. 133.

W. Ghâts, evergreen forests of Tinnevelly and Travancore, at 2,500–5,000 ft.

A small straggling shrub, the berry apparently depressed globose.

2. CINNAMOMUM RIPARIUM, Gamble in Kew Bull. 1925, 128.
W. Ghâts, from below Coorg to the Anamalais and N. Travancore, on river banks in the low country (Bourdillon).
A graceful little tree with bright blue shining ovoid berry, ·5 in. long (*C. gracile*, Bourd. Trav. Trees 302, *not of* Hook. f.).
3. CINNAMOMUM TRAVANCORICUM, Gamble in Kew Bull. 1925, 128.
W. Ghâts, evergreen forests near Chimunji, Travancore, at 4,000 ft. and upwards (Bourdillon).
A small or medium-sized tree reaching 30 ft. in height and 10 in. in diam. of trunk. Berry ovoid, purplish-blue, ·5 in. long (*C. sulphuratum*, Bourd. Trav. Trees 302, *not of* Nees).
4. CINNAMOMUM INERS, Reinw; F. B. I. v. 130; Wt. Ic. tt. 122 *bis*, 130.
W. Ghâts from Mysore and Coorg to the Anamalais and Travancore, in evergreen forests, up to about 4,000 ft.; Carnatic, Shevaroy Hills of Salem and Kollimalai Hills of Trichinopoly.
A large or medium-sized tree with coriaceous shining long leaves and ovoid berry, the fruiting perianth not ribbed.
5. CINNAMOMUM ZEYLANICUM, Blume; F. B. I. v. 131; Wt. Ic. t. 123.
W. Ghâts from S. Canara southwards, at low levels, sometimes cultivated. Cinnamon.
A moderate-sized tree. Bark brown, rough; wood light red, moderately hard, somewhat scented but not used. When cultivated for its bark it is usually, as in Ceylon, grown in coppice, hence the shape of the leaves in specimens is rather variable. Berry ovoid, dark purple, the persistent perianth ribbed. Vern. *Hind.* Dalchini; *Tam.* Karruwa; *Tel.* Sanalinga; *Mal.* Karuva.
6. CINNAMOMUM LITSEAEFOLIUM, Thw.; F. B. I. v. 133.
W. Ghâts, hills of Tinnevelly (Tadulingam), without locality (Beddome), Coimbatore (Brandis).
A tree with long-petioled leaves obscurely ribbed and nerved.
7. CINNAMOMUM WIGHTII, Meissn.; F. B. I. v. 132.
W. Ghâts, Coorg, Nilgiris, Anamalais and Pulneys, in

Shola forests, above 6,000 ft., most common at the highest levels as about Ootacamund.

A stout tree with very coriaceous leaves and ovate-oblong berries supported by a truncate cup; these berries are frequently diseased and then become globose.

8. CINNAMOMUM MACROCARPUM, Hook. f.; F. B. I. v. 133. *C. iners*, Wt. Ic. t. 130?

W. Ghâts, Sispara and other places in Nilgiris at about 6,000 ft. (Lawson, Gamble); Iyerpadi in Coimbatore (Barber).

A tree with coriaceous shining leaves and large globose-oblong berry reaching nearly 1 in. in length and supported by a large thickened cup and pedicel. The 4th row staminodes usually bear glands like the 3rd row stamens.

9. CINNAMOMUM SULPHURATUM, Nees; F. B. I. v. 132.

W. Ghâts, Coorg and Mysore to N. Coimbatore, Nilgiris and Anamalais, in Shola forests at about 4,000–6,000 ft.

A tree with pale yellowish branches and leaves, the ellipsoid berry ·5–·75 in. long, seated on the persistent perianth with spreading lobes Specimens from high levels have usually shorter and more rounded leaves.

10. CINNAMOMUM PERROTTETII, Meissn.; F. B. I. v. 134.

W. Ghâts, Nilgiri Hills, in Shola woods, above 6,000 ft.

A small tree or (perhaps) shrub with coriaceous leaves, often concave when old, much fulvous tomentose on leaves and branchlets. Berry ovoid, about ·5 in. long, seated on the perianth cup with reflexed lobes.

11. CINNAMOMUM CAUDATUM, Nees; F. B. I. v. 134.

N. Circars, Mahendragiri Hill in Ganjam at 4,500 ft. (Gamble), hills of Vizagapatam, at 4,500 ft. (A. W. Lushington).

A small tree, the berries ovoid about ·5 in. long, seated on the enlarged perianth-tube, the lobes recurved. The inner perianth-lobes are smaller than the outer.

C. Camphora, Nees, is the Camphor tree of Japan, sometimes cultivated in India, though scarce in Madras.

5. Alseodaphne, Nees.

Evergreen trees. *Leaves* alternate, often crowded at the ends of the branchlets, penninerved. *Flowers* small, hermaphrodite,

in axillary or subterminal panicles. *Perianth*-tube short, continuous with the pedicel; lobes 6, subequal, or the 3 outer rather the smaller. *Stamens* 9 perfect, those of the 1st and 2nd rows opposite the perianth-lobes, introrse, those of the 3rd row opposite the 1st row, extrorse, with 2 rather large glands on the inner bases of the filaments, staminodes of the 4th row opposite the 2nd row, cordate, stipitate; anthers all 4-celled. *Ovary* ovoid or globose; style slender; stigma peltate. *Fruit* an ellipsoid or globose berry seated on the top of the enlarged thick fleshy often warted peduncle, the perianth-lobes scarcely enlarged and usually persistent. *Seed* conform to the fruit; cotyledons fleshy.

1. ALSEODAPHNE SEMECARPIFOLIA, Nees; F. B. I. v. 144; Wt. Ic. t. 1826.

W. Ghâts, S. Canara and Malabar, in evergreen forests, at rather low levels.

A large or moderate-sized tree with many branches, the leaves elliptic-oblong or obovate, rounded or emarginate at apex, cuneate at base, often glaucous beneath, minutely reticulate, up to 6 in. long. 3 in. broad; peduncles in fruit rough; berry ellipsoid, smooth, ·5–·75 in. long. Bark yellowish-brown; wood dark brown, moderately hard, said to be useful.

Var. *angustifolia*, Meissn. Leaves elliptic-oblong or lanceolate, glaucous beneath

W. Ghâts, lower Pulney Hills (Bourné).

Var. *parvifolia*, Hook. f.; Wt. Ic. t. 1827; Bedd. Fl. t. 297. Leaves obovate or oblanceolate, 2–3 in. long, very glaucous beneath and black when dry. the panicles short, the fruit large.

W. Ghâts, Pulney Hills, Sirumalai hills of Madara and Hills of Travancore at about 4,000–5,000 ft.

6. Machilus, Nees.

Evergreen trees, leaf-buds perulate with imbricate scales. *Leaves* alternate, penninerved, reticulate. *Flowers* small or moderate-sized, hermaphrodite, in panicles from upper axils. *Perianth*-tube usually short; lobes 6. subequal or the outer slightly the smaller, persistent, spreading or reflexed in fruit. *Stamens* 9 perfect, those of the 1st and 2nd row opposite the perianth-lobes, introrse, with long filaments, those of the 3rd row opposite the 1st row, extrorse, with slender filaments and a

pair of stipitate glands at their base; staminodes of the 4th row opposite the 2nd row, cordate, stipitate; anthers 4-celled. *Ovary* sessile, style slender; stigma small or discoid. *Fruit* a globose or oblong berry seated on the scarcely enlarged perianth, whose lobes are reflexed, pedicel not enlarged. *Seed* conform to the fruit; testa thin.

MACHILUS MACRANTHA, Nees; F. B. I. v. 140; Wt. Ic. t. 1824; Bedd. Fl. t. 264. *M. glaucescens*, Wt. Ic. t. 1825.

N. Circars, hills of Vizagapatam, about 4,000 ft. (A. W. Lushington); Deccan, in hill country as at Nandidrúg, Mysore, and the forests of North Coimbatore; W. Ghâts, in most Districts from S. Canara and Coorg to Nilgiris Anamalais, Pulneys and hills of Travancore, in evergreen forests up to 7,000 ft.

A large evergreen tree with flowers in subterminal panicles. Leaves variable in size from elliptic-oblong, rounded at both ends, to oblong-lanceolate acute, glaucous beneath. Flowers also in size variable as represented in Wight's two plates. Berry black, globose, ·5–·75 in. in diam. Bark pale brown; wood reddish-white darkening on exposure, rough, used for planking and other purposes. Vern. *Tam.* Kolla mávu; *Kan.* Kurma; *Mal.* Urávu; *Badaga* Kroma.

7. Phoebe, Nees.

Evergreen shrubs or trees. *Leaves* alternate, often fascicled at the ends of the branchlets, penninerved; leaf-buds ovate or lanceolate with few scales. *Flowers* hermaphrodite or rarely polygamous, in axillary or subterminal panicles. *Perianth*-tube short; lobes 6, subequal, erect and accrescent in fruit and clasping its base. *Stamens* 9, perfect, those of the 1st and 2nd row introrse eglandular, the filaments slender, those of the 3rd row opposite the 1st row extrorse with 2 large stipitate glands at their base; staminodes of the 4th row opposite the 2nd row, cordate or sagittate, stipitate; anthers 4-celled. *Ovary* sessile, usually globose; style slender; stigma discoid. *Fruit* an ovoid ellipsoid or globose berry, seated on the erect and persistent enlarged perianth-lobes. *Seed* conform to the fruit; testa thin; cotyledons fleshy.

Branchlets, leaves and inflorescence glabrous; flowering peduncles 1–2 in. long, elongating in fruit, collected usually in the uppermost

axils; leaves lanceolate, long acuminate, long cuneate at base, up to 10 in. long and about 2 in. broad; berry black, narrowly ellipsoid, glabrous, up to ·5 in. long ..... 1. *lanceolata.*
Branchlets, leaves beneath and inflorescence minutely grey-puberulous; flowering peduncles very slender, 3–4 in. long, usually lateral from the branches below the uppermost axils; leaves oblanceolate, long-acuminate, cuneate often narrowly at base, up to 9 in. long, 3·5 in. broad, usually glaucous beneath, the nerves and transverse nervules distant; berry ovoid, ·3 in. long ..... 2. *paniculata.*
Branchlets, leaves beneath and inflorescence rusty-tomentose; flowering peduncles 1–2 in. long, both axillary and lateral near the ends of the branchlets; leaves elliptic or obovate, acuminate, cuneate at base, up to 6 in. long, 2 in. broad, nerves rather close, transverse nérvules close and prominently parallel; berry ovoid, ·3 in. long 3. *Wightii.*

1. PHOEBE LANCEOLATA, Nees; F. B. I. v. 141; Wt. Ic. t. 1821.
W. Ghâts, Wynaad, Nilgiris, Anamalais and hills of Travancore, in evergreen forests, at 3,000–5,000 ft., rather scarce.
A medium-sized tree, the young branches usually with yellowish-white bark. Wood greyish white with olive-brown heartwood, hard and close-grained.

2. PHOEBE PANICULATA, Nees *α*; F. B. I. v. 142 *in part.*
N. Circars, hills of Vizagapatam at 4,500 ft. (A. W. Lushington); Deccan, hills of N. Coimbatore; Carnatic, Kollimalai Hills of Trichinopoly; W. Ghâts, Wynaad, Pulney and Sirumalai Hills of Madura, about 3,000–5000 ft.
A tree with nearly black branchlets.

3. PHOEBE WIGHTII, Meissn.; Bedd. Fl. t. 192. *P. paniculata*, Nees *β*; F. B. I. v. 142 *in part*; Wt. Ic. t. 1820.
W. Ghâts, Nilgiris, Anamalais and Pulneys, in Shola forests, above 5,000 ft.; Bababudan Hills of Mysore at 4,500 ft.; Kollimalai Hills of Trichinopoly.
A moderate-sized tree common in Nilgiri sholas. Bark thin, brown; wood brown, smooth, with brown medullary patches. Vern. *Badaga*, Kumára.

8. **Actinodaphne,** Nees.

Evergreen trees or shrubs. *Leaves* subverticillate, rarely scattered or opposite, sometimes triple-ribbed, penninerved, the leaf-buds with imbricate perulate scales. *Flowers* small,

dioecious, in axillary or lateral dense bracteate sessile or peduncled clusters or short racemes bearing bracteateumbellules of usually 5, the bracts imbricate, caducous, the pedicels lengthening after the fall of the bracts. *Perianth*-tube short; lobes 6, subequal. *Stamens* in ♂ flowers 9, those of the 1st and 2nd row opposite the perianth-lobes, those of the 3rd row opposite those of the 1st, the filaments 2-glandular; anthers all oblong, introrse, 4-celled, filaments slender. *Staminodes* in ♀ flowers also 9, those of the 1st and 2nd rows spathulate or linear, those of the 3rd row linear and 2-glandular. *Ovary* in ♀ flowers ovoid, attenuate into the style; stigma dilated; in ♂ flowers 0 or a pistillode. *Fruit* a berry resting on the enlarged hardened flat or concave perianth-tube, the lobes persistent or deciduous. *Seed* with thin testa; cotyledons thick, usually hemispheric.

Leaves comparatively small, usually under 6 in. long and at most 1·5 in. broad, coriaceous, more or less glaucous beneath, whorled, minutely reticulate :—

Leaves lanceolate, acuminate; ♀ flowers in sessile umbels; fruiting perianth with persistent lobes :—

Leaves up to 5 in. long, innovations fulvous-silky, midrib and petiole fulvous-tomentose, main nerves short, about 12–15 pairs 1. *salicina.*

Leaves up to 4 in. long, innovations dull rusty-tomentose, midrib, petiole and leaf margins when young fulvous-tomentose, main nerves 8–10 pairs, curved .....2. *lanata.*

Leaves elliptic or oblong, acute or obtuse at apex, acute at base, up to 2·5 in. long, 1 in. broad, innovations fulvous-villous or -silky, but mature leaves glabrous; fruiting perianth with deciduous lobes 3. *campanulata.*

Leaves comparatively large, usually more than 6 in. long and 1·5 in. broad, chartaceous :—

Leaves with the lowest pair of main nerves usually opposite, subtriple-nerved :—

Lowest pair extending two-thirds up the blade, other nerves from the midrib about 3–4 pairs, leaves elliptic, shortly acuminate, cuneate at base, fulvous-tomentose as are the branchlets, petioles and inflorescence, up to 5 in. long, 2 in. broad .....4. *Bourneae.*

Lowest pair only shortly prolonged, scarcely to one-third of the blade, other nerves about 10 pairs, leaves oblong-lanceolate, acute at both ends, glabrous, glaucous beneath, up to 9 in. long, 2·5 in. broad .....5. *madraspatana.*

Leaves penninerved, the lowest pair not opposite :—

Leaves oblong-lanceolate or -oblanceolate, acuminate at both ends, the nerves very oblique, in whorls of 7–10, up to 9 in. long, 2·5 in. broad, under-surface softly grey- or cinnamomeous-tomentose ; ♀ fruiting flowers in peduncled umbels....6. *Bourdillonii.*

Leaves obovate, obtuse or obtusely acute at apex, long-cuneate at base, densely rufous-tomentose beneath and on midrib above, also on petiole, branchlets and ♀ inflorescence, up to 6 in. long, 2·5 in. broad, main nerves 8–9 pairs, often branched..7. *Lawsonii.*

Leaves elliptic-lanceolate, acuminate, attenuate at base, fulvous-villous beneath, up to 10 in. long, 3 in. broad :—

Leaves shining above, thickly villous beneath, the nerves and nervules not prominent ; ♀ fruiting flowers with patelliform shallow perianth-tube, the berry globose, ·3 in. in diam. 8. *hirsuta.*

Leaves somewhat shining above, sparsely villous beneath between the nerves, the nerves and nervules very prominent ; ♀ fruiting flowers with cup-shaped perianth-tube, the berry small (immature) .....9. *Tadulingami.*

1. ACTINODAPHNE SALICINA, Meissn. ; F. B. I. v. 148.

W. Ghâts, Sispara in Nilgiris, at 5,000–6,500 ft., in Shola forests.

A tree with narrow slender leaves, the ♂ flowers, and fruit so far not yet known.

2. ACTINODAPHNE LANATA, Meissn. ; F. B. I. v. 149.

W. Ghâts, Nilgiri Hills (Wight, Gamble), at about 5,000–6,000 ft. in Shola forests.

A tree with lanceolate leaves and a black globose berry about ·3 in. in diam., the ♂ flowers not yet known.

3. ACTINODAPHNE CAMPANULATA, Hook. f. ; F. B. I. v. 148. *A. salicina*, Bedd. Fl. t. 295, *not of* Meissn.

W. Ghâts, hills of Tinnevelly, at 4,000 ft. (Beddome, Hooper and Ramaswami).

A medium-sized tree (Bedd.), apparently a shrub (Hook. f.), with a globose berry about ·25 in. in diam.

Var. *obtusa*, Gamble. Leaves narrower, about ·7 in. broad, oblong, obtuse at apex, nearly black when dry. An elegant little tree up to 30 ft. high (Bourdillon).

W. Ghâts, evergreen forests of Travancore at 3,000–4,000 ft. (Bourdillon).

4. ACTINODAPHNE BOURNEAE, Gamble in Kew Bull. 1925, 128.
W. Ghâts, Sholas of the Pulneys Hills about Kodaikanal, 6,000 ft. (Bourne).
A small tree.

5. ACTINODAPHNE MADRASPATANA, Bedd. ex. Hook. f.; F. B. I. v. 149. *A. Hookeri*, Meissn., var. *longifolia*. *A. Hookeri*, Bedd. Fl. t. 296, *at any rate as for description.*
Deccan, Seschachalam Hills of Cuddapah at 3,000 ft. (Wight, Gamble, Fischer); Kambakam Hills of Chingleput at 2,000-2,400 ft. (Fischer); Pulicat Hills (W. Elliot).
A tree with long leaves very white beneath, close to *A. angustifolia*, Nees, of Bengal and Assam (Haines in 'Bot. Bihar and Orissa'), but distinct in fruit and in leaf-venation. Sir W. Elliot's specimen has a leaf 10 in. long, 4 in. broad.

6. ACTINODAPHNE BOURDILLONII, Gamble in Kew Bull. 1925, 129.
W. Ghâts, in most Districts from S. Canara to Nilgiris, Anamalais and hills of Travancore, up to 6,000 ft.
A small tree reaching 30 ft. in height, the young leaves quite white (Bourdillon), the wood of no value. The ♂ flowers are in large clusters with concave bracts, usually, like the ♀, pedunculate from the scars of fallen leaves.

7. ACTINODAPHNE LAWSONII, Gamble in Kew Bull. 1925, 129.
W. Ghâts, in S.E. Wynaad, about 4,000 ft. (Lawson).
Apparently a small tree. A specimen of C. B. Clarke's from Coonoor is probably this and has larger and rather thinner leaves.

8. ACTINODAPHNE HIRSUTA, Hook. f.; F. B. I. v. 152. *A. Hookeri*, Bedd. Fl. t. 296, *figure only* ?
W. Ghâts, Wynaad, Anamalais and hills of Travancore, in evergreen forests up to 3,000 ft.
A large tree reaching 60 ft. in height and a diameter of 18 in., the innovations very fulvous-silky.

9. ACTINODAPHNE TADULINGAMI, Gamble in Kew Bull. 1925, 130.
W. Ghâts, Canara to Anamalais, Travancore and Tinnevelly, in evergreen forests up to 2,000 ft.
A tree, similar to the last but with leaves with very different nervation.

9. Litsea, Lamk.

Evergreen, rarely deciduous trees or shrubs. *Leaves* alternate or sometimes opposite, penninerved. *Flowers* dioecious, in umbellules of several together, usually 4–6 but in some cases up to 15, supported by 4–6 or more concave involucral bracts; the umbellules sessile or peduncled in axillary or lateral clusters or in racemes, rarely solitary. *Perianth*-tube in ♂ flowers 0 or very small, in ♀ flowers funnel-shaped; lobes normally 6, sometimes more, sometimes 0 or very early caducous, equal or unequal. *Stamens* in ♂ flowers normally 9 or 12, in four rows, those of rows 1 and 2 usually eglandular, those of row 3 and row 4 when present with 2-glandular filaments; all stamens with 4 cells, the cells introrse or the lower pair lateral; ovary 0 or rudimentary. *Staminodes* in ♀ flowers as the stamens of the ♂ but those of the outer rows clavate or linear, those of the inner rows subulate and 2-glandular; ovary enclosed in the perianth-tube or free; style thick, often curved; stigma dilated, irregularly lobed. *Fruit* a globose ovoid ellipsoid or oblong berry, seated on the enlarged perianth-tube with the more or less thickened pedicel; pericarp usually succulent. *Seed* with thin testa and fleshy cotyledons.

Perianth-lobes incomplete or 0; stamens often many :—

Umbellules solitary, many-flowered, peduncled, with large bracts; leaves elliptic or obovate, acute or acuminate, rounded or narrowed at base, nearly glabrous above, fulvous-tomentose or -pubescent beneath, up to 10 in. long, 3–4 in. broad, the main nerves 10–15 pairs; berry depressed globose, black, ·4 in. in diam. 1. *deccanensis.*

Umbellules in pedunculate umbels or corymbs, bracts medium-sized; leaves variable, lanceolate elliptic or oblong even ovate or obovate, usually obtuse, obtuse or acute at base, glabrous above except on midrib, glabrous to grey-pubescent beneath, very minutely reticulate, up to 9 in. long, 4 in. broad, the main nerves 8–12 pairs; berry globose, purple, ·25 in. in diam. ..... 2. *chinensis.*

Umbellules solitary or in clusters, peduncled, the bracts medium-sized; leaves elliptic oblong or obovate, obtuse or acute, glabrous, prominently scrobiculate, up to 6 in. long, 1·5 in. broad, the main nerves 6–8 pairs; berry globose, ·25 in. in diam. .... 3. *ligustrina.*

Perianth-lobes complete :—

Leaves glabrous beneath or nearly so :—

Umbellules, ♂ solitary peduncled, ♀ in few-flowered peduncled racemes, all glabrous, small; leaves membranous, elliptic-oblong, abruptly acuminate, narrowed at base, glaucous beneath, up to 5 in. long, 2 in. broad, main nerves 6–12 pairs, slender
4. *venulosa*

Umbellules long-peduncled, in sessile or short-peduncled umbels, minutely puberulous; leaves subcoriaceous, elliptic-oblong or -lanceolate, acute, narrowed at base, glaucous and finely reticulate beneath, up to 10 in. long, 3 in. broad, main nerves about 12 pairs, irregular .....5. *laeta.*

Umbellules subsessile, in axillary or lateral clusters :—

Leaves subcoriaceous, elliptic-obovate or -lanceolate, shortly acute, narrow at base, very minutely puberulous beneath, up to 6 in. long, 1·5 in. broad, the main nerves 6–7 pairs, obscure
6. *coriacea.*

Leaves oblong-lanceolate, acuminate, narrowed at base, glabrous or very minutely puberulous and reticulate beneath, up to 7 in. long, 1·5 in. broad, the main nerves about 10–12 pairs .....7. *laevigata.*

Leaves narrowly linear-lanceolate, acuminate at both ends, glabrous and reticulate beneath, up to 4·5 in. long, 1 in. broad, the main nerves 6–7 pairs .....8. *mysorensis.*

Umbellules in racemes :—

Leaves black when dry, coriaceous, quite glabrous as are the racemes, long- (·75 in.), petioled, elliptic, obtusely acute or acuminate, narrowed at base, up to 5 in. long, 2 in. broad, main nerves 9–12 pairs, scarcely visible .....9. *nigrescens.*

Leaves reddish-brown beneath when dry, greenish above :—

Leaves very coriaceous, quite glabrous, thick-petioled, elliptic, elliptic-oblong or -lanceolate, obtuse or acute at apex, narrowed or rounded at base, up to 6 in. long, 2·5 in. broad, main nerves 8–12 pairs, not prominent; berry depressed globose, 1 in. in diam. on a short flattened undulate perianth-tube, the pedicel very thick.....10. *oleoides.*

Leaves coriaceous, glabrous, elliptic- or lanceolate-oblong, acute or acuminate, narrowed at base, up to 8 in. long, 2·5 in. broad, main nerves 8–12 pairs prominent; berry ellipsoid, ·5 in. long, seated on the cup-shaped perianth-tube
11. *Stocksii.*

Leaves coriaceous, glabrous, often very red beneath, elliptic- or linear-oblong, acute, narrowed at base, up to 6 in. long,

2 in. broad, main nerves 10–12 pairs, prominent; berry (not ripe) ovoid, seated on the obconic perianth-tube
12. *glabrata.*

Leaves white-glaucous beneath when dry :—

Leaves elliptic-obovate or lanceolate-oblong, obtuse or acute, narrowed at base, glabrous, or pubescent only on the nerves when young, up to 7 in. long, 2·5 in. broad, but usually smaller, the 7–10 pairs of main nerves very faint; berry ellipsoid, nearly ·5 in. long, seated on the cup-shaped perianth-tube with thick pedicels ..*Stocksii* var. *glabrescens.*

Leaves linear-oblong or lanceolate, obtuse or acute, up to 3·5 in. long, ·75 in. broad, the main nerves 8–10 pairs rather close and prominent .....13. *Beddomei.*

Leaves pubescent or tomentose beneath :—

Umbellules in sessile or subsessile axillary or lateral clusters :—

Leaves alternate :—

Leaves chartaceous, elliptic or elliptic-oblong or -obovate, obtuse or slightly acute at apex, rounded at base, softly fulvous-pubescent beneath, up to 8 in. long, 4 in. broad, main nerves 8–12 pairs, transverse nervules parallel; berry ovoid or ellipsoid, ·3 in. long, on a small recurved flattened perianth-tube .....14. *polyantha.*

Leaves coriaceous, elliptic-oblong or -obovate, obtuse, slightly acute at base, roughly fulvous-pubescent beneath, up to 9 in. long, 4·5 in. broad, main nerves 10–12 pairs, transverse nervules parallel and conspicuous; berry ellipsoid, 1 in. long, ·6 in. broad, on a deep obconic warted cup ·5 in. long .....15. *insignis.*

Leaves subcoriaceous, obovate or obovate-oblong, obtuse and abruptly acute at apex, cuneate at base, minutely fulvous-pubescent beneath, up to 9 in. long, 4 in. broad, main nerves 12–18 pairs, closer towards the base; berry oblong, ·5 in. long, on a cup-shaped 2–4-cleft glabrous, usually sessile perianth-tube .....16. *Bourdillonii.*

Leaves usually opposite at the ends of the branchlets, alternate lower down, membranous, oblong or obovate, acuminate, fulvous pubescent beneath, especially on the nerves, up to 7 in. long, 2 in. broad, main nerves 8–12, looped to join near the margin, berry globose, on a cup-shaped, shortly lobed perianth-tube .....17. *travancorica.*

Umbellules in racemes :—

Leaves comparatively small, obovate elliptic or lanceolate,

obtuse or rarely acute, fulvous-pubescent beneath, especially on the nerves, sometimes nearly glabrous, up to 4 in. long, 2 in. broad, main nerves 4–8 pairs prominent, the transverse nervules obscure; berry ovoid, ·4–·5 in long, seated on the cup-shaped perianth-tube, the pedicel thickened ..... 18. *Wightiana.*

Leaves large, elliptic- or obovate-oblong, acute or acuminate, densely fulvous-tomentose beneath, up to 10 in. long, 4 in. broad, main nerves 10–15 pairs, prominent as are the transverse nervules; berry oblong, ·5–·75 in. long, seated on the turbinate perianth-tube with thick pedicel ..... 19. *floribunda.*

1. LITSEA DECCANENSIS, Gamble n. comb. *L. tomentosa*, Heyne; F. B. I. v. 157 *Tetranthera tomentosa*, Roxb.; Wt. Ic. t. 1834.

   Deccan, in the hills of Cuddapah, Mysore and Chittoor at about 2,000–4,000 ft.; Carnatic, hills of S. Arcot, Salem and Trichinopoly; W. Ghâts, in all Districts, in rather dry forests at 3,000–6,000 ft.

   A moderate-sized tree with soft grey or tawny branchlets and leaves. The wood is said to be yellowish and likely to be useful. Vern. *Mar.* Chikua; *Tel.* Naramamidi; *Tam.* Perumbandali.

2. LITSEA CHINENSIS, Lamk. *L. sebifera*, Pers.; F. B. I. v. 157. *Tetranthera apetala*, Roxb. Cor. Pl. t. 147.

   N. Circars, from Ganjam to the Godavari, in hill forests; Deccan, in the hills of Nellore (Ramaswami) and Cuddapah (Gamble), very scarce in the forests of the W. Ghâts.

   A moderate-sized tree with thin leaves of variable size, shape and pubescence. Bark brown; wood greyish-brown, moderately hard. Vern. *Hind.* Maida; *Tel.* Narra alagi.

3. LITSEA LIGUSTRINA, Hook. f.; F. B. I. v. 158. *Tetranthera ligustrina* Nees; Wt. Ic. t. 1835.

   Deccan, hills of N. Coimbatore, 2,000–5,000 ft.; W. Ghâts, Nilgiris, Pulneys and hills of Tinnevelly, especially Nilgiris on E. side, at 3,000–6,000 ft.

   A small tree, with glabrous very reticulate leaves.

4. LITSEA VENULOSA, Hook. f.; F. B. I. v. 161.

   W. Ghâts, hills of Tinnevelly about Courtallum, 3,000–4,000 ft. (Wight, Beddome).

   A straggling evergreen shrub.

5. LITSEA LAETA, Wall.; F. B. I. v. 169.
N. Circars, Mahendragiri in Ganjam, at 4,000 ft. (Gamble), Rampa Hills at 2,500 ft. (Gamble).
A small tree, the berry globose, seated on a turbinate enlarged perianth-tube nearly ·5 in. in diam.

6. LITSEA CORIACEA, Hook. f.; F. B. I. v. 166.
W. Ghâts, S. Canara, Coorg, Wynaad, Anamalais and evergreen forests of Travancore, up to 4,000 ft.
A small tree with leaves often green above, dull grey beneath when dry, the branchlets puberulous, the umbellules grey-silky in bud, the berry small, ovoid, in a cup-shaped perianth-tube. Vern. *Tam.* Panni thali; *Mal.* Maravetti thali.

7. LITSEA LAEVIGATA, Gamble n. comb. *Tetranthera attenuata* var. *laevigata*, Nees, Syst. Laur. 677.
W. Ghâts, in the Tinnevelly Hills about Courtallum (Wight); hills of Mysore at 2,000 ft. (Meebold).
A tree with leaves when dry green above, reddish brown beneath, the branchlets pale, the umbellule bracts grey silky, the berry oblong in a small obconic perianth-tube.

8. LITSEA MYSORENSIS, Gamble in Kew Bull. 1925, 130.
W. Ghâts, hills of Mysore at 3,000–4,000 ft. (Meebold), Wynaad (Beddome).
A small or medium-sized tree with very small sessile clusters of umbellules.

9. LITSEA NIGRESCENS, Gamble n. comb. · *Tetranthera Panamanja*, Wt. Ic. t. 1836, *not of* Buch.-Ham.
W. Ghâts, hills of Tinnevelly and Travancore, at low levels (Wight, Bourdillon).
A moderate-sized tree, the racemes 1·5 in. long, the fruit not known.

10. LITSEA OLEOIDES, Hook. f.; F. B. I. v. 175.
W. Ghâts, Nilgiris, Anamalais and hills of Travancore, above 4,000 ft. in evergreen forests, especially common in S. Nilgiri sholas towards Sispara.
A large tree with thick leaves, the racemes fulvous pubescent, about 2 in. long. The uppermost leaves are sometimes opposite.

11. LITSEA STOCKSII, Hook. f.; F. B. I. v. 176.

W. Ghâts, Nilgiris, Anamalais and hills of Travancore, at 2,000–6,000 ft. in evergreen forests.

A small tree, the racemes usually short and few-flowered, silky pubescent.

Var. *glabrescens*, Hook. f. Leaves very white beneath.

W. Ghâts, in Nilgiris, on W. side, Naduvattam to Sispara, at 4,000–6,000 ft.

A small tree.

12. LITSEA GLABRATA, Hook f.; F. B. I. v. 178.

W. Ghâts, Nilgiris and Pulneys, above 6,000 ft., in Shola forest; Bababudan Hills of Mysore at 5,000 ft. (Meebold).

A tree.

13. LITSEA BEDDOMEI. Hook. f.; F. B. I. v. 177.

W. Ghâts, hills of Tinnevelly and Travancore about 4,000 ft., in evergreen forests (Beddome, Bourdillon, Barber).

A small tree with small leaves and short flower-racemes.

14. LITSEA POLYANTHA, Juss.; F. B. I. v. 162. *Tetranthera monopetala*, Roxb. Cor. Pl. t. 148; Brand.For. Fl. t. 45.

N. Circars, hills of Ganjam and Vizagapatam, at 3,000–4,000 ft. (A. W. Lushington); hills of Godavari (Gamble, Herb-Madr.), usually in shady places and ravines.

A moderate-sized evergreen tree with soft leaves when young, the not very conspicuous transverse nervules ·1 in. apart. Bark dark grey, smooth, scaly; wood olive-grey, soft, not much used. Vern. *Hind.* Maida; *Ur.* Mosonea.

15. LITSEA INSIGNIS, Gamble in Kew Bull. 1925, 130.

W. Ghâts, Anamalai Hills (Barber), hills of Travancore, at low levels up to 1,000 ft. (Bourdillon) in evergreen forests.

A lofty tree with yellowish flowers in great quantity on the old wood, leaving tubercles. The leaves are thick and the parallel transverse nervules ·2 in. apart, the fruit and its cup very large.

16. LITSEA BOURDILLONII, Gamble in Kew Bull. 1925, 131.

W. Ghâts, Anamalais and hills of Travancore, at 2,500–6,000 ft. in evergreen forests.

A moderate-sized or large tree with the flowers, both ♂ and ♀, in dense tufts on the branchlets, axillary or lateral. The usually close main nerves of the obovate leaves are characteristic.

17. LITSEA TRAVANCORICA, Gamble in Kew Bull. 1925, 132.

W. Ghâts, hills of Travancore, in evergreen forests (Lawson, Venkoba Row).

A tree.

18. LITSEA WIGHTIANA, Hook. f.; F. B. I. v. 117 *in part. Cylicodaphne Wightiana*, Nees; Wt. Ic. t. 1833.

W. Ghâts, Nilgiri Hills, above 6,000 ft., in Shola forests, common; hills of Travancore and Tinnevelly, above 4,000 ft., in evergreen forests, less so.

A large evergreen tree with tawny branchlets and foliage. Bark light brown, smooth, with somewhat horizontal lenticels; wood yellowish brown, hard; apparently only used for fuel. Vern. *Badaga* Keynjee.

Var. *tomentosa*, Meissn. Leaves oblong-lanceolate, acuminate, narrower and with more (up to 10) pairs of main nerves, the berry larger, the cup deeper.

W. Ghâts, Anamalais and Pulney Hills, above 6,000 ft., common; Nilgiris scarce.

19 LITSEA FLORIBUNDA, Gamble n. comb. *L. Wightiana*, Hook. f.; F. B. I. v. 177 *in part. Cylicodaphne floribunda*, Bl. in Mus Bot. Lugd. Bat. i. 387. *Tetranthera Wightiana*, Bedd. Fl. t. 293.

W. Ghâts, in all Districts, at 2,000–6,000 ft., in evergreen forests; Bababudan Hills and hills of W. Mysore and Coimbatore, on Nilgiris chiefly on E. slopes up to Coonoor and Kotagiri.

A large or moderate-sized tree, the ♂ racemes often 3–4 in. long.

10. Neolitsea, Merr.

Evergreen trees. *Leaves* alternate opposite or in whorls, triple-ribbed, usually areolate-reticulate; buds perulate. *Flowers* dioecious, in 3–7-flowered umbellules arranged in clusters or short racemes in the axils of the upper leaves or on the branchlets between the nodes, the clusters with small bracts at their bases; involucral bracts 4, deciduous, pedicels elongating. *Perianth*-lobes 4. *Stamens* in ♂ flowers 6, those of the 2 outer rows eglandular, those of the 2 inner biglandular opposite the 1st row; anther-cells all introrse or the lower lateral. *Staminodes* of ♀ flowers 6, arranged as the stamens, usually linear or linear-clavate. *Ovary* ovoid; style thick; stigma usually peltate

in ♂ flowers 0 or a small pistillode. *Fruit* a globose or ellipsoid berry seated on the somewhat enlarged perianth-tube and somewhat elongate pedicel; pericarp smooth. *Seed* conform to the fruit, cotyledons hemispheric.

Fruiting perianth very small compared with the berry, about ·1 in. in diam. :—

Berry oblong, ·3–·4 in. in diam., on a crenate perianth-tube scarcely ·1 in. in diam.; leaves subcoriaceous, glabrous, glaucous beneath, elliptic- or oblong-lanceolate, obtusely acute, up to 4 in. long, 1–1·5 in. broad, nerves from the midrib 2–4 pairs....1. *zeylanica.*

Berry globose, ·5 in. in diam., on a very small entire perianth-tube; leaves very coriaceous, thickly fulvous-villous when young on the ribs and nerves beneath, very white-glaucous, ovate, acuminate, up to 7 in. long, 3 in. broad, nerves from the midrib 3–5 pairs, outside the side ribs about 5–6, all prominent, the transverse nervules parallel .....2. *Fischeri.*

Fruiting perianth rather large compared with the berry, ·25 in. :—

Fruiting perianth cup-shaped, entire; berry globose, ·3–·4 in. in diam.; leaves coriaceous, glabrous, sometimes glaucous beneath, elliptic-ovate or even orbiculate, shortly acute, up to 5 in. long, 3 in. broad, minutely but prominently scrobiculate; nerves from the midrib 2–3 pairs, obscure .....3. *scrobiculata.*

Fruiting perianth patelliform, entire; berry globose, about ·25 in. in diam.; leaves chartaceous or subcoriaceous, glabrous, very glaucous beneath when young, ovate or lanceolate, acuminate, up to 7 in. long, 3 in. broad, areolate, nerves from the midrib 2–3 pairs, faint .....4. *foliosa* var. *caesia.*

1. NEOLITSEA ZEYLANICA, Merr. *Litsea zeylanica*, Nees; F. B. I. v. 178 *in part*; Wt. Ic. tt. 132, 1844; Bedd. Fl. t. 294; *L. oblonga*, Nees; Wt. Ic. t. 1845

   N. Circars, Mahendragiri in Ganjam, at 4,000 ft.; Deccan, hills of Mysore and Coimbatore; W. Ghâts, in all Districts, in evergreen and Shola forests, above 2,000 ft.

   A small or moderate-sized tree. Bark thick, smooth, grey; wood light brown to yellow, moderately hard, said to have the scent of Sweet Briar (Bedd.).

2. NEOLITSEA FISCHERI, Gamble in Kew Bull. 1925, 132.

   W. Ghâts, Anamalais and hills of Cochin and Travancore, above 6,000 ft., in evergreen forest.

   A large tree with large tawny perulate buds and golden

fulvous young leaves and shoots. The old leaves are large and very coriaceous with prominent ribs, nerves and transverse nervules. It somewhat resembles *Actinodaphne Hookeri* var. *dasypoda* but the fruit is different.

3. NEOLITSEA SCROBICULATA, Gamble n. comb. *Litsea scrobiculata*, Meissn. in DC. Prodr. xv. i. 223.

W. Ghâts, Nilgiris, about 6,000 ft.; hills of Tinnevelly.

A tree reaching 50 ft. in height, the leaves long-petioled.

4. NEOLITSEA FOLIOSA, Gamble n. comb. *Litsea foliosa*, Nees in Syst. Laur. 622.

Var. *caesia*, Meissn. in DC. Prodr. xv. i. 222.

N. Circars, hills of Vizagapatam, Rampa Hills of Godavari, about 2,000 ft.; Deccan, Seshachalam Hills of Cuddapah, hills of Mysore and Coimbatore; Carnatic, Javadi Hills of S. Arcot; W. Ghâts, hills of S. Travancore, all at low levels and up to 5,000 ft. at most.

A tree with long-petioled, usually long-acuminate very glaucous leaves.

11. Cassytha, Linn.

Filiform twining parasites, adhering to their host by suckers. *Leaves* consisting of minute scales or 0. *Flowers* small, hermaphrodite, spicate capitate or racemose; bracteoles 3. *Perianth*-tube short and globose or turbinate and as long as the lobes; lobes 6, the 3 outer smaller. Perfect *stamens* 9 or 6, 2-celled; those of the 1st row opposite the outer perianth-lobes introrse, those of the 2nd row opposite the inner, also introrse, sometimes reduced to staminodes; those of the 3rd row opposite the 1st row extrorse, the filaments with a pair of glands at the base; within these and opposite the 2nd row, 3 sessile or stipitate staminodes. *Ovary* globose, free in flower but included in the perianth-tube, which closely covers it in fruit; style short; stigma small or capitate. *Fruit* a drupe enclosed in the enlarged inflated perianth-tube, crowned by the remains of the lobes and stamens; pericarp of 2 layers, the outer thin, the inner thick and hard. *Seed* conform to the drupe; testa thin; cotyledons fleshy, at length confluent.

Stems fairly stout about ·1 in. thick where attached to the host, very long and twining cord-like; flowers sessile, in spikes ·5–2 in. long; drupe globose ..... 1. *filiformis.*

Stems very slender, thread-like; flowers sessile, in very small pedunculed heads; drupe oblong ovoid, bluntly 6-angled.....2. *capillaris.*

1. CASSYTHA FILIFORMIS, Linn.; F. B. I. v. 188; Wt. Ic. t. 1847.

   All plains Districts, on bushes, especially near the coast.

   Common on various species of young trees and bushes.

2. CASSYTHA CAPILLARIS, Meissn.; F. B. I. v. 188.

   Tinnevelly District, at Kannikatti (Barber), also in Ceylon.

   A rare species, found by Barber on *Apama Barberi.*

Persea gratissima, Gaertn., the Avocado Pear, of the West Indies, is sometimes found in cultivation for its pleasant fruit.

Family CXXVII. HERNANDIACEAE.

Trees or climbing shrubs. *Leaves* alternate, simple or pinnate, entire or lobed; stipules 0. *Flowers* hermaphrodite, monoecious or polygamous, regular, usually small, white or greenish. *Perianth* superior; lobes free or shortly united below in two valvate 3–5-merous whorls or in one imbricate 4–8-merous whorl. *Stamens* 3–5 in one whorl; anthers 2-celled, dehiscing introrsely or laterally by 2 valves; staminodes glandular, in 1 or 2 whorls outside the stamens or absent. *Ovary* inferior, 1-celled; ovule solitary, pendulous, anatropous. *Fruit* dry, often longitudinally ribbed, sometimes with 2–4 longitudinal wings or with 2 terminal wings formed by accrescent perianth-lobes, or else wingless and enclosed in an inflated cupule. *Seed* solitary; albumen 0; cotyledons large, more or less lobed and twisted.

Gyrocarpus, Jacq.

A tall tree with thick branches. *Leaves* alternate, large, long-petioled, entire or lobed, clustered towards the ends of the branches. *Flowers* small, unisexual, ♂ very numerous, ♀ few, also a few hermaphrodite mixed, in large dense ebracteate cymes. *Perianth* in ♂ flowers, 4–7-partite, in ♀ 2-lobed, the lobes enlarged in fruit. *Stamens* 4–7, inserted at the bottom of the perianth, alternating with as many clavate staminodes; anthers 2-celled, dehiscing by valves. *Ovary* 1-celled; ovule 1, pendulous from the apex of the cell; stigma sessile. *Fruit* drupe-like, crowned with the long wing-like persistent perianth-lobes. *Seed* solitary; cotyledons large, convolute.

GYROCARPUS AMERICANUS, Jacq. *G. Jacquini*, Roxb. Cor. Pl. t. 1; Bedd. Fl. t. 196; F. B. I. ii. 461.

N. Circars, especially in Godavari and Kistna, in forests of the E. Ghâts; Deccan and Carnatic, in deciduous forests, extending West to the E. slopes of the W. Ghâts.

A large deciduous tree with large soft leaves often deeply lobed. Bark thin, greyish-white with a silvery lustre; wood soft, grey, in considerable demand for making catamarans, also for boxes, trays and toys. Vern. *Hind.* Zaitun; *Ur.* Pitella; *Tel.* Tanaku.

Family CXXVIII. PROTEACEAE.

Trees or shrubs, rarely herbs. *Leaves* alternate, rarely opposite or verticillate, entire toothed or pinnatisect; stipules 0. *Flowers* capitate spicate racemose or rarely solitary, hermaphrodite, regular or irregular; bracts small, caducous or nearly obsolete, sometimes imbricate, hardened in fruit forming a cone; bracteoles 0–2. *Perianth* inferior; lobes 4, at first valvately connate in a tube with gibbous base, at length more or less separating with recurved tips. *Stamens* 4, on and opposite to the perianth-lobes; anthers erect, the connective continuous with the filaments, cells 2 introrse, dehiscing longitudinally. *Disk* of 4 hypogynous scales, sometimes 0. *Ovary* superior, sessile or stipitate, 1-celled, often oblique; style terminal, thickened at tip; stigma terminal or lateral; ovules solitary or in pairs or many, biseriate. *Fruit* a nut or drupe indehiscent or ultimately opening on the inner edge or at the tip, or a follicle or capsule with often coriaceous valves. *Seeds* solitary or in pairs or few; testa membranous or coriaceous, sometimes winged; albumen 0; cotyledons compressed or fleshy, often unequal; radicle short, inferior or lateral.

Helicia, Lour.

Trees or large shrubs. *Leaves* alternate, entire toothed or pinnatisect. *Flowers* in terminal and axillary racemes, hermaphrodite, regular, usually in pairs; bracts small, caducous; bracteoles minute. *Perianth*-tube slender; limb narrow, ovate or oblong, lobes revolute in flower. *Stamens* 4; anthers oblong, connective produced in an apiculus. *Disk* of 4 hypogynous scales, free or connate. *Ovary* sessile; style slender; stigma

terminal; ovules 2, basal or lateral, attached below the middle. *Fruit* a subglobose hard nut. *Seeds* 1–2, subglobose or hemispheric; testa rugose or veined; cotyledons fleshy.

Leaves petioled, acute at base, elliptic-oblanceolate, acuminate, coarsely dentate, up to 7 in. long, 3 in. broad; flowers in bud ·5–·7 in. long.....1. *nilagirica.*

Leaves subsessile, rounded at base, obovate-oblong, obtusely acute, entire or distantly serrate, up to 9 in. long, 3·5 in. broad, shining above and reticulate; flowers in bud ·7–1 in. long .....2. *travancorica.*

1. HELICIA NILAGIRICA, Bedd.; F. B. I. v. 190.

   W. Ghâts, Walaghât in Malabar at 3,000 ft. (Beddome); Devála in S.E. Wynaad at 3,000 ft. (Gamble), in evergreen forests.

   A small tree with chartaceous leaves and globose purple fruit ·5 in. in diam.

2. HELICIA TRAVANCORICA, Bedd.; F. B. I. v. 191. *H. robusta*, Bedd. Fl. t. 301, *not of* Wall.

   W. Ghâts, hills of Tinnevelly and Travancore, at 4,000 ft. on the banks of streams (Bedd.).

   A handsome tree of good size with coriaceous leaves and greenish-yellow flowers, the fruit globose, ·75 in. in diam.

Several species of chiefly Australian Proteaceous shrubs are in cultivation in the Botanic Gardens in the Nilgiris. *Grevillea robusta*, A. Cunn., the Silk Oak, a moderate-sized handsome tree of Australia, has been much cultivated in S. India, both in the forests for its handsome prettily grained wood, and in tea estates as a shade plant. It is so far acclimatized that it reproduces itself naturally from seed.

Family CXXIX. THYMELAEACEAE.

Shrubs or trees with tough fibrous bark, rarely herbs. *Leaves* alternate or opposite, simple, entire. *Flowers* usually hermaphrodite, in axillary or terminal heads umbels clusters or racemes; bracts various, often forming an involucre. *Perianth* regular, tubular or campanulate, often corolline, 4–5-lobed, the lobes imbricate in bud, often with scales at their bases within. *Stamens* as many or twice as many as the lobes of the perianth, those opposite the lobes usually attached above the alternate ones; filaments short; anthers erect, 2-celled, dehiscing longitudinally. *Disk* hypogynous, annular cupular or of scales,

sometimes 0. *Ovary* superior, 1–2-celled; ovule 1 in each cell, anatropous, pendulous from the apex of the cell; style short or long, terminal or excentric; stigma usually capitate. *Fruit* a small berry drupe or capsule. *Seed* solitary or one in each cell, pendulous or lateral; testa crustaceous, rarely membranous; albumen fleshy or 0; cotyledons fleshy, usually thick; radicle short, superior.

Ovary 1-celled, 1-ovuled; fruit indehiscent; flowers in close bracteate heads; stamens 10 ..... 1. **Lasiosiphon.**
Ovary 2-celled, cells 1-ovuled; fruit a loculicidal capsule; flowers in small ebracteate umbels; stamens 5 ..... 2. **Gyrinops.**

1. Lasiosiphon, Fresen.

Silky shrubs. *Leaves* opposite or alternate and scattered. *Flowers* hermaphrodite, in dense heads with broad bracts. *Perianth*-tube cylindric, circumsciss above the ovary; lobes 5, spreading; scales above the stamens 5, alternate with the perianth-lobes. *Stamens* 10 in 2 rows, the upper or all shortly exserted; anthers oblong or linear. *Disk* 0 or short, annulate. *Ovary* sessile, 1-celled; style filiform; stigma capitate. *Fruit* small, dry, included in the base of the perianth, pericarp membranous. *Seed* conform to the pericarp; testa crustaceous; albumen scanty or 0.

LASIOSIPHON ERIOCEPHALUS, Dcne.; F. B. I. v. 197. *Gnidia eriocephala*, Meissn.; Wt. Ic. t. 1859.

W. Ghâts, in all Districts, at 4,000–7,000 ft. in open forests.

A small tree or large shrub with linear-oblong leaves and bright yellow flowers in dense terminal white silky heads surrounded by an involucre of silky bracts. Bark grey, smooth, the inner bark fibrous; wood white or yellowish-white, hard. Vern. *Tam.* Nacchi nár; *Mal.* Nanju.

Var. *sisparensis*. *Gnidia sisparensis*, Meissn.; Wt. Ic. t. 1860. Leaves obovate obtuse subsessile; heads with fulvous hairs.

Sispara in Nilgiris (Gardner); Palghât Hills (Beddome); Mysore (Lobb.).

2. Gyrinops, Gaertn.

Small trees. *Leaves* alternate, shining, the lateral nerves very fine, numerous and parallel. *Flowers* hermaphrodite, in terminal

and axillary few-flowered umbels, ebracteate, bracteoles small. *Perianth*-tube slender; lobes 5, spreading; scales above the stamens connate in a ring. *Stamens* 5, in one row at the mouth of the perianth-tube and opposite the lobes; anthers subsessile. *Ovary* stalked, 2-celled; ovule 1 in each cell; style subulate; stigma ovoid. *Fruit* a stipitate compressed ovoid capsule; loculicidally 2-valved. *Seeds* ovoid, with a tail-like basal appendage; testa crustaceous; albumen 0.

GYRINOPS WALLA, Gaertn.; F. B. I. v. 199; Wt. Ic. t. 1850; Bedd. Fl. t. 303.

Tinnevelly (Beddome), a Ceylon plant.

A small tree with yellowish foliage, the leaves oblong, obtusely acuminate, 2–4 in. long, about 1 in. broad, with close minute parallel nerves.

Wikströmia viridiflora, Meissn. is a Malay shrub, cultivated in gardens in Madras.

Family CXXX. ELAEAGNACEAE.

Trees or shrubs, often thorny, with numerous silvery or coppery scales on the branches inflorescence and under-surface of the leaves especially. *Leaves* alternate or opposite, entire; stipules 0. *Flowers* small, regular, hermaphrodite or dioecious, solitary or in axillary fascicles spikes or racemes; bracts small, deciduous. *Perianth* in hermaphrodite or ♀ flowers tubular, constricted above the ovary, persistent below, deciduous above, limb 2–4-lobed; in ♂ flowers reduced to a 2–4-lobed limb. *Stamens* in hermaphrodite flowers adnate to the throat of the perianth-tube, as many as the lobes and alternate with them, in ♂ flowers to perianth-base, twice as many as the lobes; filaments free; anthers oblong, 2-celled, the cells dehiscing longitudinally. *Ovary* free, 1-celled; style filiform; stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* a nut, closely covered by the thickened perianth-base, pericarp membranous. *Seed* erect; testa hard; albumen scanty or 0; cotyledons thick, fleshy; radicle inferior.

Elaeagnus, Linn.

Trees or shrubs, often thorny, with silvery or stellate scales. *Flowers* hermaphrodite, axillary, solitary or in fascicles or racemes. *Perianth*-tube campanulate or funnel-shaped, narrowed

above the ovary; lobes 4, valvate, deciduous. *Stamens* 4, on the mouth of the perianth, on a ring, alternate with the lobes. *Ovary* 1 celled; style linear; stigma lateral. *Fruit* a nut enclosed in the thickened perianth-base. *Seed* with hard shining testa.

Scales very shining, silvery only; flowers small, the perianth-tube narrowly cylindric, the clusters few-flowered only; leaves thin, elliptic-lanceolate, up to 3 in. long, 1·5 in. broad, acute at apex, 5–6-nerved; drupe small, ellipsoid-oblong, ·3–·6 in. long, the putamen grooved ..... 1. *indica.*

Scales shining or dull, silvery and coppery, usually mixed; clusters many-flowered:—

Leaves rather large, up to 8 in. long, 3 in. broad, thin, elliptic or elliptic-oblong or obovate, acute or acuminate at apex, 5–6-nerved; perianth-tube urceolate, ·2–·3 in. long; drupe large, oblong, ·5–1 in. long, the putamen grooved ..... 2. *conferta.*

Leaves medium-sized, 2–3 in. long, 1·5–2 in. broad, thick, ovate or ovate-oblong or orbicular, obtuse or rarely acute at apex, usually rounded at base, 3–4-nerved; perianth-tube broadly urceolate, ·2–·3 in. long; drupe oblong-ellipsoid, ·5–·75 in. long... 3. *Kologa.*

1. ELAEAGNUS INDICA, Servettaz in Bull. Herb. Boiss., ser. 2, viii. 393.

   Deccan, hills of N. Coimbatore, to 3,500 ft.; Carnatic, hills of S. Arcot, Salem and Madura, west to E. slopes of W. Ghâts.

   A slender straggling shrub.

2. ELAEAGNUS CONFERTA, Roxb. *E. latifolia*, Linn.; F. B. I. v. 202 *in part only*; Brand. For. Fl. t. 46.

   N. Circars, hills of Vizagapatam (A. W. Lushington); W. Coast and W. Ghâts, at low levels, but occasionally up to 5,000 ft.

   A large often thorny straggling shrub with red edible fruit.

3. ELAEAGNUS KOLOGA, Schlecht. in DC. Prodr. xiv. 611. *E. latifolia*, Linn.; F. B. I. v. 202, *in part only*; Wt. Ic. t. 1856.

   W. Ghâts, Nilgiris and Pulneys above 5,000 ft., margins of Shola woods and open scrub forests; Bababudan Hills of Mysore.

   A large sometimes thorny straggling or climbing shrub with orange-red edible fruit. Vern. *Tam.* Kolungai.

Family CXXXI. LORANTHACEAE.

Evergreen shrubs, rarely herbs, usually parasitic on the branches of trees; stems much branched, often jointed. *Leaves* opposite or sometimes alternate, coriaceous, entire, sometimes reduced to scales or 0; stipules 0. *Flowers* regular or zygomorphic, hermaphrodite or unisexual, sometimes large and brightly coloured, sometimes inconspicuous, in racemes spikes heads or fascicles, usually bracteate and often with 2 or more bracteoles. *Calyx* adnate to the ovary; limb annular or cupular, entire or shortly toothed, sometimes 0. *Petals* or perianth-segments 3–8, valvate, free or more or less connate in a tube. *Stamens* as many as and opposite to the petals and more or less adnate to them; filaments slender or 0; anthers basifixed or dorsifixed, opening by longitudinal slits or by rows of cells or by pores. *Ovary* inferior, 1-celled; usually without distinct placenta; style short or long; stigma simple. *Fruit* a 1-seeded berry or drupe with fleshy pericarp and often viscid mesocarp. *Seed* solitary without distinct testa; albumen fleshy or none; embryo straight, usually fleshy; radicle superior.

Calyx present, though the limb is sometimes reduced to a rim only; flowers hermaphrodite, anthers basifixed :—

Calyx-tube supported by a bract, no bracteoles.....1. **Loranthus.**

Calyx-tube supported by a bract and two bracteoles..2. **Elytranthe.**

Calyx obsolete or represented by a rim; flowers unisexual :—

Anthers 2-celled, opening longitudinally; plants without leaves 3. **Korthalsella.**

Anthers opening by many pores, combined with the perianth-lobes; plants with or without leaves .....4. **Viscum.**

1. Loranthus, Linn. (restricted).

Parasitic shrubs with many branches. *Leaves* opposite or alternate or both, usually thick and fleshy or coriaceous, entire. *Flowers* hermaphrodite, usually coloured, in racemes spikes cymes or fascicles, in the axils of leaves or of the scars of fallen leaves, rarely terminal; bract usually small, supporting the base of the calyx-tube; bracteoles 0. *Calyx*-tube adnate to the ovary, the limb short, truncate or toothed. Corolla polypetalous or gamopetalous, regular or zygomorphic; lobes 4–6, valvate, free or more or less connate in a tube, erect or reflexed, the tube often split down one side. *Stamens* as many as the corolla-lobes

and adnate to them; filaments usually slender; anthers basifixed, usually linear, opening by longitudinal cells, sometimes septate. *Disk* 0. *Ovary* 1-celled; style filiform, sometimes geniculate; stigma entire, obtuse or capitate. *Fruit* baccate, globose ovoid ellipsoid or oblong, crowned by the persistent calyx-limb. *Seed* albuminous, adnate to the pericarp, usually surrounded by glutinous pulp; testa 0; embryo straight; radicle superior.

Corolla lobes free :—

Flowers in spikes, on excavations in a thickened rhachis; leaves coriaceous, opposite or alternate, the innovations mealy-pubescent :—

Leaves lanceolate, obtusy elacuminate at apex, narrowed at base, up to 3 in. long, 1 in. broad, petiole ·2–·3 in. long; spikes 1–2 in. long; flowers in bud ·25 in. .....1. *Hookerianus.*

Leaves elliptic orbicular or obovate, obtuse at apex, slightly narrowed at base, up to 1·5 in. long, ·5–1 in. broad, petiole ·1–·2 in. long; spikes 1–1·5 in. long; flowers in bud ·4 in...2. *Wightii.*

Flowers in racemes, solitary or fascicled on the nodes of old branchlets; leaves coriaceous, opposite or alternate :—

Branchlets, leaves and inflorescence glabrous :—

Flowers in bud ·15–·25 in. long, straight, terete, in slender racemes 1–3 in. long; leaves elliptic ovate or orbicular, obtuse, narrowed at base, up to 4 in. long, 2·5 in. broad, petiole ·2–·4 in. long .....3. *Wallichianus.*

Flowers in bud ·5–·75 in. long, straight or curved, angular, in rather stout often solitary racemes up to 4 in. long; leaves broadly ovate or elliptic, obtuse, usually rounded cordate or sometimes auricled at base, up to 6 in. or more long, 3·5 in. broad, petiole stout, ·5–·7 in. long.....4. *intermedius.*

Branchlets and inflorescence, sometimes the leaves more or less, furfuraceous pubescent; flowers in bud ·5–1 in. long, curved, angular, in racemes 2–4 in. long; leaves ovate, obtuse or obtusely acute, acute or rounded or auricled at base, up to 5 in. long, 2·5 in. broad, petiole to 1 in. long .....5. *obtusatus.*

Corolla gamopetalous :—

Corolla-lobes 4; flowers in bud narrow, clavate at tip and acute, densely covered with mealy golden tomentum, in axillary fascicles or short cymes, the tube ·5–1 in. long, split down one side :—

Leaves ovate, orbicular or elliptic, obtuse, rounded at base, nearly glabrous above, more or less rusty tomentose beneath, up to 3 in. long, 1·5 in. broad; petiole short, sometimes 0

6. *buddleioides.*

Leaves ovate, covered, more or less, on both surfaces, with white or tawny flocculent tomentum :—

Leaves coriaceous, obtuse or slightly acute at apex, cordate at base, up to 4 in. long, 2·5 in. broad, petiole ·75 in. long
7. *cordifolius.*

Leaves subcoriaceous, bluntly acute or obtuse at apex, narrowed or rounded at base, up to 3·5 in. long, 2·5 in. broad, petiole ·5–1 in. long ..... 8. *pulverulentus.*

Corolla-lobes 5 :—

Corolla densely tomentose :—

Bracts large, up to ·5 in. long ; calyx-teeth distinct ; corolla-tube ·75–1 in. long, curved, somewhat inflated at the middle, grey-tomentose without ; leaves alternate, orbicular or obovate obtuse, up to 1 in. in diam., sometimes much less, softly white grey or tawny tomentose ..... 9. *bracteatus.*

Bracts small, ovate :—

Calyx-teeth short, triangular, regular ; corolla-tube curved, split half-way, inflated below, ·4–·6 in. long, densely rusty-floccose-woolly ; leaves alternate, obovate, obtuse, cuneate at base, black above when dry, densely rusty-floccose below, up to 2·5 in. long, 1 in. broad, nerves 3 pairs, prominent
10. *tomentosus.*

Calyx-teeth long and irregularly lobed ; corolla-tube curved, split half-way, gibbously inflated below the middle, ·5–·75 in. long, rusty-villous ; leaves obovate, obtuse, cuneate at base, blackish green above when dry, thinly grey- or tawny-pubescent beneath or glabrous, up to 3 in. long, 1·5 in. broad, 3-nerved at base ; berry oblong ..... 11. *recurvus.*

Corolla at first stellate-pubescent, afterwards nearly or quite glabrous :—

Bract boat-shaped, longer than the calyx ; calyx very white-lanate, shortly and evenly toothed ; corolla-tube slender, inflated at the middle, ·75 in. long ; leaves obovate, obtuse, cuneate at base, grey-lanate, up to 1 in. long, ·4 in. broad
12. *courtallensis.*

Bract ovate, shorter than the calyx ; calyx-lobes irregular and again toothed ; corolla-tube slender, straight or very slightly inflated above, finally glabrous without, ·75–1·25 in. long ; leaves obovate, obtuse or retuse, cuneate at base, 3-nerved, up to 1·5 in. long, ·75 in. broad, glabrous and black when dry ..... 13. *cuneatus.*

Corolla glabrous without, with very rare exceptions :—

Flowers in racemes :—

Branchlets terete :—

Racemes 1–4 in. long, solitary or fascicled, usually upcurved with upcurved flowers varying in length from 1–2·5 in. ; bract concave ; calyx entire, truncate ; leaves thickly coriaceous, opposite or alternate, varying from elliptic or oblong to orbicular cordate or to linear, and up to 7 in. long, 4 in. broad ; berry ovoid-oblong 14. *longiflorus.*

Racemes about 1 in. long, many-flowered, the flowers 1–1·5 in. long ; bract short, cup-shaped ; calyx cupular, obtusely unequally 5-lobed ; leaves very coriaceous, large, opposite or alternate, obtuse, elliptic-oblong or orbicular, up to 4 in. long, 2 in. broad.....15. *sarcophyllus.*

Branchlets trigonous ; racemes 1–1·5 in. long, the flowers ·5–·75 in. long ; bract cup-shaped, very oblique ; calyx cupular, spreading, truncate ; leaves very coriaceous, large, broadly elliptic ovate or orbicular, obtuse or acute, up to 6 in. in diam. .....16. *trigonus.*

Flowers in axillary fascicles or cymes :—

Flowers sessile, fascicled at the nodes of the branches ; corolla 1 in. long, the lobes spirally twisted ; bract very small ; calyx-limb cupular, entire ; leaves very coriaceous, opposite, sessile, ovate elliptic or orbicular, obtuse, acute at base, up to 4·5 in. long, 2 in. broad, 3–5-ribbed ; berry globose.....17. *elasticus.*

Flowers solitary or in very short peduncled cymes, chiefly in the axils of fallen leaves ; corolla 1 in. long, cleft to the middle, one or two divisions to the base, lobes recurved ; bract small ; calyx obscurely toothed ; leaves very coriaceous, opposite, variable, usually elliptic-oblong -lanceolate or -obovate, obtuse, narrowed at base, up to 6 in. long, 4 in. broad, nerves few and irregular ; berry obovoid 18. *neelgherrensis.*

Flowers in axillary or lateral peduncled umbellate cymes, corolla 1–1·5 in. long, very straight, erect ; bracts cup-like but one-sided ; calyx-lobes triangular ; leaves coriaceous, opposite or alternate, oblong-lanceolate, acute, cuneate at base, up to 3 in. long, 1·25 in. broad, the nerves obscure ; berry oblong .....19. *memecylifolius.*

Flowers in groups of about 5, the bracts forming a large bell-

shaped involucre, the groups 2–3 together in the axils of th leaves or of the scars of fallen leaves ; calyx-tube tomentos limb shortly 5-toothed ; corolla slender, 1·5–2 in. long, con stricted slightly below the limb ; leaves thinly coriaceou opposite or alternate, orbicular or oblong, rounded at bas up to 5 in. long, 3 in. broad .....20. *lageniferu*

1. LORANTHUS HOOKERIANUS, W. & A. 381; F. B. I. v. 207.
W. Ghâts, Nilgiris, Anamalai Hills and hills of Tinnevelly up to 4,000 ft.
A rather slender parasitic shrub, the branches speckle with minute tubercles. Has been found on *Mallotu philippinensis* (Fischer).
2. LORANTHUS WIGHTII, Hook. f.; F. B. I. v. 207.
W. Ghâts, Courtallum and Chokampatti hills of Tinne velly, about 3,500 ft. (Wight, Beddome).
A slender parasitic shrub with speckled nodose branchlets
3. LORANTHUS WALLICHIANUS, Schultes; F. B. I. v. 205 W. & A. 381; Wt. Ic. t. 143.
W. Ghâts, in all Districts from S. Canara southwards, u to about 4,000 ft.
A rather stout parasitic shrub with pale brown teret branchlets and pale red flowers. Found by Fischer o *Helicteres* and *Memecylon*.
4. LORANTHUS INTERMEDIUS, Wight; Hook. f. in F. B. I. v 205.
W. Ghâts, Nilgiris, Pulneys and hills of Travancore, a 3,000–6,000 ft.
A stout parasitic shrub, the flowers red, common in Nilgir Sholas and often on *Cinnamomum Wightii* (Barber) and *Machilus macrantha* (Fischer).
5. LORANTHUS OBTUSATUS, Wall.; F. B. I. v. 205; W. & A 381; Bidie Report on Neelgh. Loranths t. iii.
W. Ghâts, in most Districts, especially at high levels in Nilgiris, Pulneys, etc., at above 5,000 ft.
A large parasitic shrub with red and orange flowers, often found on *Rhododendron*, *Symplocos*, *Daphniphyllum* and many other Shola trees, also on *Acacia Melanoxylon* in the plantations.
6. LORANTHUS BUDDLEIOIDES, Desv.; W. & A. 382. *L. Scurrula*, Roxb. Cor. Pl. t. 140; F. B. I. v. 208, *not* of Linn.

N. Circars, Mahendragiri Hill in Ganjam, 4,500 ft. (Fischer and Gage), Rampa Hills (V. Narayanswami); Deccan, hills of Mysore, Bellary and Coimbatore; W. Ghâts, chiefly on W. and E. slopes, up to 6,000 ft.

A parasitic shrub found growing on various different kinds of tree; flowers greenish-yellow.

7. LORANTHUS CORDIFOLIUS, Wall.; F. B. I. v. 209.

Deccan, in hilly country, Chittoor to Coimbatore, 2,000–3,000 ft.; W. Ghâts, Nilgiris, at 2,000–5,000 ft.

A large parasitic shrub, conspicuous from the thick fascicles of orange-tawny flowers and white or pale brown young leaves and shoots.

8. LORANTHUS PULVERULENTUS, Wall.; F. B. I. v. 211.

N. Circars, forests of the E. Ghâts, Ganjam to Rampa, at 1,000–2,500 ft. (Gamble, Barber).

A stout parasitic shrub, found on deciduous trees chiefly.

9. LORANTHUS BRACTEATUS, Heyne; F. B. I. v. 213. *L. tomentosus*, W. & A. 385; Wt. Ic. t. 378.

N. Circars, Deccan and Carnatic, in forests of Vizagapatam, Nellore, S. Arcot, Cuddapah and Kurnool, up to 2,000 ft. westwards to the E. slopes of W. Ghâts.

A small parasitic shrub, the flowers in cymes or umbels of 3–5, greenish, striped, on various species of deciduous tree.

10. LORANTHUS TOMENTOSUS, Heyne; F. B. I. v. 212; Bidie t. viii.

Deccan, hills of Mysore and N. Coimbatore, 3,000–5,000 ft.; W. Ghâts in S. Canara (Hohenacker), Coorg, Wynaad, at 3,000–4,000 ft. (Gamble), and southwards.

A small parasitic shrub, the branchlets nearly black; found in Coorg on *Neolitsea zeylanica*, also by Fischer on various other kinds of tree.

11. LORANTHUS RECURVUS, Wall.; F. B. I. v. 213; W. & A. 383. *L. Candolleanus*, W. & A. 385; Wt. Ic. t. 305.

W. Ghâts, Nilgiri Hills, in Shola woods above 6,000 ft.

A parasitic shrub with smooth grey bark, ovoid-oblong fruits, yellow flowers and characteristic calyx, reported as growing in the Nilgiri Sholas and plantations on *Acacia Melanoxylon*, *Viburnum*, *Glochidion*, etc.

12. LORANTHUS COURTALLENSIS, Gamble, *n. comb.* *L. bracteatus*, Heyne, var. *angustifolia*, Hook. f.; F. B. I. v. 213.

W. Ghâts, Pulney Hills and hills of Tinnevelly about Courtallum, (Wight, Barber).

A slender twiggy parasitic shrub.

13. LORANTHUS CUNEATUS, Heyne; F. B. I. v. 214; W. & A. 385; Bidie t. ix.

N. Circars and Deccan, in hilly country; W. Ghâts, in most Districts, at various levels, common.

A bushy shrub with grey bark and prominent nodes, parasitic on a great variety of trees and shrubs, indigenous and introduced (like *Acacia Melanoxylon*). The corolla is greenish-yellow outside, orange within, the stigma red, also the fruits.

14. LORANTHUS LONGIFLORUS, Desv.; F. B. I. v. 214; W. & A. 384; Wt. Ic. t. 302. *L. bicolor*, Roxb. Cor. Pl. t. 139.

All plains Districts, chiefly in deciduous forests, common.

A large parasitic shrub with handsome and conspicuous racemes of scarlet orange or pink flowers succeeded by pink berries. It is found on a great number of different hosts.

Var. *falcatus*, Kurz. Leaves linear or falcate, up to 6 in. long, the flowers rather short.

Plains Districts, chiefly in the dry country, frequently on *Acacia* and its neighbours.

Var. *amplexifolius*. Leaves large, orbicular or shortly oblong, obtuse cordate and amplexicaul at base, the flowers often long and the racemes frequently terminal. *L. amplexifolius*, DC.; Bidie t. vii.

W. Ghâts, chiefly in hilly regions up to 6,000 ft., in most Districts.

Var. *pubescens*, Hook. f. Leaves rather small, oblong, racemes with the flowers minutely pubescent.

W. Coast and lower hills of W. Ghâts.

15. LORANTHUS SARCOPHYLLUS, Wall; W. & A. 384; F. B. I. v. 217.

W. Ghâts, Nilgiris and hills of Madura (Wight).

A very stout parasitic shrub, much resembling *L. longiflorus* but recognized by the calyx-lobes. Said to grow on *Ficus*.

16. LORANTHUS TRIGONUS, W. & A. 386; F. B. I. v. 219.

W. Ghâts and W. Coast from S. Canara southwards,

Coorg, Nilgiris and Pulneys up to 3,000 ft.; Bababudan Hills of Mysore, at 3,500 ft. (Meebold).

A large very thick and fleshy parasitic shrub with warted branches and trigonous branchlets, found on the Banyan fig (Gamble) and other trees.

17. LORANTHUS ELASTICUS, Desv.; F. B. I. v. 216; W. & A. 386; Wt. Ic. t. 343. *L. Euphorbiae*, Wt. Ic. t. 1063.

Deccan, in Mysore; Carnatic, Kambakam Hill in Chingleput, 2,000 ft., Melpat in S. Arcot, Kollimalai Hills of Trichinopoly; W. Coast, S. Canara to Travancore also at low levels in W. Ghâts.

A dichotomously branching parasitic shrub with striped green and white flowers, red stamens and a pink berry. It is not uncommon on the mango, orange, nutmeg, *Samadera*, *Thespesia*, and other trees of hot low-level country. The smaller-leaved *L. Euphorbiae* is found on the tree *Euphorbias*, *E. tortilis* and *E. antiquorum*, in Coimbatore, and is perhaps distinct.

18. LORANTHUS NEELGHERRENSIS, W. & A. 382; F. B. I. v. 216; Wt. Ic. t. 1020; Bidie tt. iv. v. x.

W. Ghâts, Nilgiris, Anamalais and Pulneys, at high levels above 4,000 ft.

A large woody parasitic shrub with crimson-scarlet flowers, orange inside the tube, the berry red, also the young leaves. It is common on many shola trees and also very frequent on the introduced Australian *Acacias*.

Var. *Clarkei*, Hook. f. Flowers small with short corolla-lobes. Nilgiri Hills at 7,000 ft. (C. B. Clarke).

19. LORANTHUS MEMECYLIFOLIUS, W. & A. 383; F. B. I. v. 217.

W. Ghâts, Nilgiri Hills, above 5,000 ft.

A stout glabrous parasitic shrub with scarlet corolla. It occurs on various shola trees, Rhododendron, *Rapanea*, *Daphniphyllum*, etc.

20. LORANTHUS LAGENIFERUS, Wt. Ic. t. 306: F. B. I. v. 218.

W. Coast, S. Canara, Mysore and Malabar, apparently in deciduous forests (Wight, Rangachari).

A large parasitic shrub, the involucre reddish, the corolla green or green and red. Dr. Cooke gives it as found on *Holarrhena* and *Adina*.

2. Elytranthe, Blume (amplified).

Parasitic shrubs. *Leaves* opposite or subopposite, more or less coriaceous, entire. *Flowers* few, in spikes racemes or pairs with 1 bract and 2 bracteoles which may be free or combined in a cup. *Calyx*-tube cylindric, the limb small, truncate. *Corolla*-tube usually entire, more or less cylindric or funnel-shaped; lobes 5 or 6, usually 6, equal, reflexed in flower. *Stamens* 5–6, anthers basifixed, often septate. *Ovary* enclosed in the calyx-tube; style slender; stigma usually capitate. *Fruit* and *seed* as in *Loranthus*.

Corolla 1–2 in. long, cleft to nearly half-way down, usually curved; leaves ovate-oblong or lanceolate, up to 5 in. long, 2 in. broad
1. *loniceroides.*

Corolla under 1 in. long, cleft to below the middle, hardly curved; leaves elliptic-lanceolate, up to 4 in. long, 1·5 in. broad..2. *capitellata.*

In both species the bract and bracteoles are orbicular, the latter combined in a cup, the anthers septate, very slender.

1. ELYTRANTHE LONICEROIDES, Engler. *Loranthus loniceroides*, Linn.; F. B. I. v. 221; Wt. Ic. t. 203; Bidie t. vi. *except anthers and ovary.*

W. Ghâts, in Mysore, Nilgiris, Anamalais and Pulneys, chiefly at levels above 5,000 ft.; a form in Coimbatore below 3,000 ft. has smaller leaves.

A large parasitic shrub with variegated corolla, the tube scarlet or pink below changing to yellow, the lobes green. The berry is green tipped with the cylindric calyx-limb. The large-leaved hill form is abundant on Australian Acacias, but also occurs on various Shola trees; the small-leaved one is chiefly found on *Terminalia*, *Anogeissus* and various species of fig.

2. ELYTRANTHE CAPITELLATA, Engler. *Loranthus capitellatus*, W. & A. 382; F. B. I. v. 221.

Deccan and Carnatic, in hilly country, westwards to the lower hills of the W. Ghâts, up to about 3,000 ft.

A parasitic shrub with variegated corolla, the tube white changing to red and above to green, with purple lines. It is found on various plains trees like the mango, figs, etc.

3. Korthalsella, van Tiegh.

Leafless parasitic small shrubs, the branches jointed, furnished with bracteate scales at the joints, the joints all in the same plane. *Flowers* in the axils of the scales, monoecious, surrounded by tufts of hair, ♂ and ♀ with 3 perianth-lobes which are persistent after flowering in ♀. *Anthers* 3, 2-celled, the cells opening introrsely by longitudinal slits, but the anthers being connected at their margins, the pollen issues from a central aperture. *Ovary* obovoid; placenta central; stigma small. *Fruit* an obovoid fleshy berry with viscid mesocarp, embryo basal. *Seed* albuminous.

KORTHALSELLA JAPONICA, Engler. *Viscum japonicum*, Thunb.; F. B. I. v. 226. *V. moniliforme*, W. & A. 380; Wt. Ic. t. 1018, and Spic. Neelg. t. 87.

W. Ghâts, Nilgiri, Anamalai and Pulney Hills, above 5,000 ft. A small densely tufted parasitic undershrub with obovate keeled flatt ·d joints and minute flowers. It is found on Shola trees ‹specially on *Rhododendron*, *Vaccinium*, *Eurya* and *Ilex*.

Var. *coralloides*: *Viscum moniliforme*, W. & A., var. *coralloides*, Wt. Ic. t. 1019, is really only a smaller form with narrower joints.

4. Viscum, Linn.

Parasitic shrubs, growing on trees; branches usually 2–3-chotomous, jointed, the internodes terete, angular or flattened. *Leaves* opposite, flat and thick or reduced to small scales. *Flowers* usually monoecious, small, fascicled or solitary or more often in triads, in the axils of the leaves or at the nodes of the branches, rarely terminal, bracts small; bracteoles 2, free or connate in a cup. *Perianth*-tube in ♂ solid, in ♀ adnate to the ovary; lobes usually 4, sometimes 3, short, ovate or triangular. *Stamens* as many as the perianth-lobes and adnate to them, dehiscing introrsely by numerous pores. *Ovary* inferior, 1-celled; ovules solitary or paired; stigma sessile or subsessile. *Fruit* a succulent berry with soft viscid mesocarp. *Seed* adnate to the pericarp; albumen copious, solid; embryo terete enclosed in the albumen, solitary or 2 to each seed.

Leafy shrubs :—

Leaves always present and persistent :—

Leaves acuminate at apex, obliquely ovate or lanceolate, often falcately curved, narrowed at base, 3–5-ribbed, 1·5–4 in. long, ·5–1 in. broad ; bracteoles apiculate ; lateral flowers of triads usually ♀, central ♂ or wanting ; berry oblong....1. *monoicum.*

Leaves obtuse at apex ; bracteoles not apiculate :—

Berry globose, very minutely papillose ; leaves obovate elliptic or oblong, petioled, obtuse or slightly acute, attenuate at base, 3- rarely 5-ribbed, 1–2 in. long, ·4–1·5 in. broad ; lateral flowers of triads usually ♂, central sometimes all ♀..2. *orientale.*

Berry oblong :—

Berry smooth ; leaves elliptic, waved at the margin, obtuse or very slightly acute, shortly petioled, 1–2 in. long, ·4–1 in. broad ; 3–5-ribbed ; flower-triads clustered, the flowers all or lateral ♀, inner ♂, the ♀ elongate, the ♂ often with 3 perianth-lobes only .....3. *orbiculatum.*

Berry, especially when young, covered with little warts ; leaves obovate or oblong, obtuse or slightly acute, attenuate at base to a short petiole, ·5–1·5 in. long, ·4–·7 in. broad, 3- rarely 5-ribbed ; flowers fascicled, in peduncled triads, the lateral usually ♂ .....4. *verruculosum.*

Leaves apparently deciduous, sometimes wanting altogether :—

Leaves usually present, broadly orbicular-obovate, emarginate and usually mucronate at apex, cuneate and decurrent at base, about 1–1·25 in. in diam., obscurely 3- or pedately 5-ribbed ; middle flower of triad usually ♂ ; berry ovoid, rough, white or pale green .....5. *capitellatum.*

Leaves usually absent, when present only on lower branches, obovate, about 1 in. long, 3-ribbed ; outer flowers of triads usually ♂ ; berry very small, subglobose .....6. *ramosissimum.*

Leaves few and sparse, yellow when dry like the angular branchlets, oblanceolate, up to 1·5 in. long, about ·3 in. broad, 3-ribbed ; outer flowers of triads ♂ .....7. *mysorense.*

Leafless shrubs :—

Internodes of the branchlets tetragonous, uniform ; flowers minute, in triads, sessile, solitary or whorled at the nodes, the ♂ flowers usually lateral, the ♀ central ; berry minute, globose, ·1 in. in diam. 8. *angulatum.*

Internodes of the branchlets flattened, broadening gradually from the base to the top ; each at right angles to its neighbours, but twisted near the base, so that all seem to be in one plane ; flowers

in axillary fascicles of 1–3, the central flower of a triad usually ♀; berry globose, up to ·15 in. in diam., glassy white..9. *articulatum.*

1. VISCUM MONOICUM, Roxb.; F. B. I. v. 224; W. & A. 379 (under *V. orientale*).
   N. Circars, hills of Ganjam and Vizagapatam, up to 3,500 ft. (Barber, A. W. Lushington); W. Ghâts, Pulney Hills in Poombarai valley (Bourne), Nilgiris (G. Thomson).
   A parasitic shrub with rather thin leaves and usually yellowish berry.
2. VISCUM ORIENTALE, Willd.; F. B. I. v. 224; W. & A. 379.
   N. Circars and Carnatic, especially Coast Districts, but also westwards to lower hills of W. Ghâts in Coimbatore.
   A rather large shrub, parasitic on many kinds of tree, *Albizzia, Pongamia, Wrightia*, etc., berry purple.
3. VISCUM ORBICULATUM, Wt. Ic. t. 1016; Spic. Neilg. t. 86; F. B. I. v. 224.
   W. Ghâts, Nilgiri Hills, above 5,000 ft.
   A small bushy shrub with angular grooved branches, found by Wight on *Vaccinium Leschenaultii.*
4. VISCUM VERRUCULOSUM, W. & A. 379; F. B. I. v. 224.
   Deccan, hills of N. Coimbatore; W. Ghâts, Nilgiris, Anamalais and hills of Tinnevelly and Travancore, up to 6,000 ft.
   A parasitic shrub with usually terete branches.
5. VISCUM CAPITELLATUM, Sm.; F. B. I. v. 225; W. & A. 380.
   Carnatic, Coast of S. Arcot (Lawson); Deccan, N. Coimbatore Hills (Fischer); W. Ghâts, S. E. Wynaad at 3,000 ft. (Gamble).
   A small parasitic shrub with stout usually terete branches, found in two forms, the leafy one (α of W. & A.) with obtuse broad obovate leaves, perhaps *V. trilobatum*, Talbot, the other with few obovate spathulate leaves (β of W. & A.) and usually more floriferous. It has been found on various trees, *Rhizophora, Salvadora*, etc., also on *Loranthus longiflorus*, especially var. *falcatus.*
6. VISCUM RAMOSISSIMUM, Wall.; W. & A. 380; F. B. I. v. 225.
   Deccan, in Mysore and Coimbatore; W. Ghâts, Nilgiris to hills of Tinnevelly up to 6,000 ft.

A many and slenderly branched parasitic shrub, almost broom-like, with terete branches and branchlets. It is found on various trees, *Acacia*, *Rhus*, *Santalum*, *Ficus*, also on *Loranthi*.

7. VISCUM MYSORENSE, Gamble in Kew Bull. 1925, 329.
Deccan, Arsikere in Mysore, about 2,000 ft. (Meebold).
A parasitic shrub, yellow when dry, the internodes of the branchlets angular or flattened.

8. VISCUM ANGULATUM, Heyne *ex* DC.; F. B. I. v. 225. *V. ramosissimum*, Wt. Ic. t. 1017, *except* ♂ *flowers*.
W. Ghâts, in most Districts on the lower hills up to 4,000 ft., chiefly on N. and E. sides; forests of N. Coimbatore.
A leafless slender parasitic shrub, found on various species of chiefly deciduous trees.

9. VISCUM ARTICULATUM, Burm.; F. B. I. v. 226. *V. attenuatum*, DC.; W. & A. 380.
N. Circars and Carnatic from the Godavari southwards, westwards to the lower hills of W. Ghâts.
A slenderly-branched parasitic shrub, the internodes scarcely ·3 in. in maximum diameter, longitudinally striate. The ♂ flowers are very small and scarce, the ♀ very often solitary, the berry ·1 in. in diam. Found on many species, chiefly of deciduous trees.

Var. *dichotomum*, Kurz. Much stouter and more common, ut not easily separated in some cases, the internodes up to ·5 n. broad and very prominently striate; flowers larger and sually in triads; berry about ·15 in. in diameter.
N. Circars, Deccan and Carnatic in most Districts, on many species of tree.

Family CXXXII. SANTALACEAE.

Trees, shrubs or herbs, many being parasitic or semiparasitic n the branches or roots of other plants. *Leaves* alternate or pposite, entire, sometimes scale-like or 0; stipules 0. *Flowers* ermaphrodite or unisexual, regular, small, solitary or in simple · compound cymes; bracts usually small; bracteoles 2, sometimes 1 or both obsolete. *Perianth* superior or partly inferior, -8-lobed or -toothed, the lobes often with a tuft of hairs behind ıe anthers. *Stamens* as many as and opposite to the perianth-

lobes, attached to or above the perianth-base; anthers 2-celled. *Disk* epigynous or perigynous. *Ovary* 1-celled, inferior; ovules 2–3, adnate to or pendulous from a central column; style short; stigma entire or 3–6-lobed. *Fruit* a nut or drupe. *Seed* globose or ovoid, smooth rugose or sulcate; testa thin or wanting; albumen copious, fleshy; embryo usually terete; radicle superior.

Herbs; perianth semi-superior, the tube adnate to the base of the ovary and usually produced above it; fruit a small nut....1. **Thesium.**
Trees or shrubs; perianth superior, the tube adnate to the ovary, not produced above it; fruit a drupe :—
Not spinous; anther-cells distinct, parallel; drupes small :—
Leaves opposite; stamens with interposed processes; flowers hermaphrodite, the perianth-lobes usually 4.....2. **Santalum.**
Leaves alternate; stamens without interposed processes; flowers polygamous, the perianth-lobes usually 3 .....3. **Osyris.**
Often spinous; anther-cells divergent or confluent; leaves alternate, drupe large .....4. **Scleropyrum.**

1. Thesium, Linn.

Slender perennial herbs, usually parasitic on roots. *Leaves* alternate, narrow, decurrent. *Flowers* minute, greenish, solitary and axillary or in 2-chotomous cymes, hermaphrodite. *Perianth* adnate to the ovary, the tube produced above it; lobes 5, rarely 4. *Stamens* 5 or 4, inserted at the base of the perianth-lobes, included. *Ovary* inferior; ovules 2–3, pendulous from a basal often flexuous column; style cylindric or very short; stigma capitate or lobed. *Fruit* a dry nut, often ribbed. *Seed* conform to the nut; embryo terete, straight or oblique; cotyledons small; radicle as long as or longer than the cotyledons.

THESIUM WIGHTIANUM, Wall.; F. B. I. v. 230; Wt. Ic. t. 1853, *except the anthers.*

W. Ghâts, Nilgiris and Pulneys and Atapadi Hills of Malabar, above 6,000 ft., on the downs among grass.

A slender plant with many straggling branches often procumbent at the base, narrow linear leaves, small solitary flowers, and a small hard globose nut.

2. Santalum, Linn.

Trees or shrubs usually semiparasitic on the roots of other kinds; branches usually slender, glabrous. *Leaves* opposite or

rarely alternate, glabrous. *Flowers* hermaphrodite, axillary or in terminal 3-chotomous paniculate cymes; bracts minute *Perianth*-tube campanulate or ovoid, adnate to the base of the ovary; lobes 4, rarely 5, valvate, with a tuft of hairs on the face. *Stamens* 4 or 5, adnate to the bases of the perianth-lobes, alternating with the fleshy scales of the disks; filaments short; anthers ovate, the cells distinct, parallel. *Disk* of the scales between the stamens. *Ovary* at first free, later semi-inferior; ovules 2–3, pendulous from below the top of a long acuminate central column; style elongate; stigma 2–3-lobed. *Fruit* a subglobose drupe, annulate on the top by the deciduous perianth, endocarp rugose. *Seed* subglobose; albumen copious; embryo terete, slender; radicle longer than the cotyledons.

SANTALUM ALBUM, Linn.; F. B. I. v. 231; Bedd. Fl. t. 256. *Sirium myrtifolium*, Roxb. Cor. Pl. t. 2.

N. Circars, in Vizagapatam, scarce; Carnatic, hills of S. Arcot, Salem and southwards; Deccan, in all Districts but especially in Mysore, Coimbatore and plains N. of Nilgiris, up to 3,000 ft.; W. Ghâts, on E. slopes in Mysore, Coorg and Nilgiris; in dry open scrub forests and hedgerows. Sandal. A small evergreen usually semiparasitic glabrous tree with elliptic-ovate leaves up to 3 in. long, 1·5 in. broad, glaucous beneath, the flowers brownish-purple, the drupe black when ripe. Bark dark grey, rough; wood hard and close-grained, sapwood white, scentless, heartwood yellowish-brown, strongly scented and in great demand for carvings, the distillation of oil, export to China, etc., and in burial ceremonies. For an account of the parasitism and growth of the tree, the "spike" disease, etc., see Troup, Silv. Ind. Trees iii. 749. Vern. *Hind.* Chandan; *Tam.* Srigandam; *Tel.* Chandanum.

3. Osyris, Linn.

Shrubs with angular branchlets. *Leaves* alternate, entire; stipules 0. *Flowers* small, axillary, polygamous (♂ and ♀) the ♂ flowers in clusters, the ♀ often solitary. *Perianth*-tube solid in the ♂ flowers, adnate to the ovary in the ♀; lobes 3–4, triangular, valvate, with a tuft of hair on the face. *Stamens* 3 or 4, inserted at the base of the perianth-lobes; anther-cells distinct. *Disk* angular, between the stamens. *Ovary* inferior, sunk in the

perianth-tube; ovules 2–4, pendulous from a short central placenta; style short; stigma 3–4-lobed. *Fruit* a globose or ovoid drupe. *Seed* globose, solitary; embryo small. in the centre of copious fleshy albumen.

OSYRIS ARBOREA, Wall.; F. B. I. v. 232. *O. Wightiana*, Wall.; Wt. Ic. t. 1853.

N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft. (Gamble); Deccan, in hills in Mysore, on Horsleykonda, Chittoor, 4,000 ft.; Carnatic, Shevaroy Hills of Salem; W. Ghâts, in most Districts, above 3,000 ft.

An evergreen shrub with coriaceous elliptic-lanceolate even orbicular leaves mucronate at apex, very small flowers and small hard yellow drupe. Bark greyish-brown, rough; wood red, close-grained. Vern. *Mar.* Popli.

4. Scleropyrum, Arnott.

Trees with axillary spines. *Leaves* alternate, coriaceous. *Flowers* polygamous, in short catkin-like spikes at the leafless nodes of the branchlets. *Perianth*-tube of ♂ flowers solid, of ♀ or ☿ flowers adnate to the ovary; lobes 4–5, valvate or sub-imbricate, with a tuft of hair behind the stamens. *Stamens* 4–5, inserted at the base of the lobes; filaments bifid, the anther-cells on separate branches, dehiscing transversely. *Disk* annular, undulate. *Ovary* inferior; ovules 3, pendulous from the top of a central column; style short; stigma large, peltate. *Fruit* a pyriform drupe on a thickened pedicel, crowned by the remains of the perianth-lobes; exocarp thick, fleshy, endocarp hard. *Seed* 1, globose; albumen copious; embryo terete, central; cotyledons oblong.

SCLEROPYRUM WALLICHIANUM, Arn.; F. B. I. v. 234; Wt. Ic. t. 241. *Pyrularia Wallichiana*, A. DC.; Bedd. Fl. t. 304.

W. Ghâts, S. Canara to Travancore, in evergreen forests, up to 3,000 ft.; Coorg and Wynaad, 3,000–5,000 ft.

A small tree with thick, sharp, conical spines, small reddish flowers and large red drupe, the leaves ovate-oblong, up to 7 in. long, 3 in. broad, 3–5-ribbed at base.

Family CXXXIII. BALANOPHORACEAE.

Glabrous, fleshy root-parasites, without leaves, stomata or chlorophyll, the rhizomes hard and warted, through the rind of

which the flowering stems burst irregularly and are usually stout and scaly. *Flowers* monoecious or dioecious, crowded in large globose or elongate stoutly-peduncled heads, the ♂ and ♀ flowers very dissimilar; the ♂ of 3–8 valvate perianth-lobes, fairly large, sometimes 0; the ♀ without perianth and very minute or confluent with the ovary, often mixed with clavate bodies. *Stamens* as many as the perianth-lobes and opposite to them or the filaments connate in a column or tube; anthers free or connate, 2–many-celled, opening by pores or valves or bursting irregularly. *Ovary* 1–3-celled, ovule 1 in each cell usually pendulous; styles 1–2 or 0, stigmas simple or capitellate. *Fruit* minute, 1-seeded. *Seed* usually adherent to the pericarp, testa thin or 0, albumen granular and oily; embryo very minute.

Balanophora, Forst.

Glabrous fleshy herbs with a tuberous rootstock warted with lenticels abounding in a waxy secretion. *Peduncles* bursting through the rootstock, which forms a ring or sheath at their base. *Flowers*: ♂ with a perianth of 2–6 valvate lobes, stamens 2–∞, the filaments 0 or connate in a column, the anthers (in our species) horse-shoe-shaped; ♀ without perianth, ovary ellipsoid, 1-celled; style long, slender; stigma simple, many minute flowers surrounding a clavate body. *Fruit* minute, crustaceous. *Seed* globose; albumen oily; embryo of 2–3 cells only.

Heads in ♂ cylindric, in ♀ ovoid; perianth-lobes usually 4, oblong, acute, reflexed; staminal column elongate ..... 1. **dioica.**
Heads in ♂ obovoid or subglobose, in ♀ globose, often very large; perianth-lobes usually 4, short, obtuse, erect; staminal column short 2. **indica.**

1. BALANOPHORA DIOICA, R. Br.; F. B. I. v. 237.
   N. Circars, hills of Vizagapatam (Gamble).
   As the ♂ flowers only are available, the identification is uncertain.
2. BALANOPHORA INDICA, Wall.; F. B. I. v. 237.
   W. Ghâts, in the hills from Nilgiris to Travancore, up to 5,000 ft.
   A thick rather common parasite, often very large, especially with the globose ♀ heads, reddish-brown or purple.

Family CXXXIV. BUXACEAE.

Trees or shrubs, rarely herbs. *Leaves* opposite or alternate, usually coriaceous and evergreen; stipules 0. *Flowers* unisexual, usually monoecious, in axillary or rarely terminal spikes or racemes, the ♂ and ♀ usually adjoining each other but the ♀ sometimes distinct; bracteate and bracteolate. *Perianth* calyciform, the lobes free and imbricate. *Stamens* as many as and usually opposite to the perianth-lobes; filaments erect, broad; anthers dorsifixed, the cells dehiscing longitudinally. *Ovary* 2–3-celled, rarely more, the cells 1–2-ovuled, the ovules with dorsal raphe; styles 2–3, short, usually recurved. *Fruit* a 2–3-celled capsule, or an indehiscent berry. *Seeds* 2–3 in each cell, often reduced to 1; testa crustaceous, smooth; albumen copious; cotyledons fleshy, flattened; radicle superior.

Leaves opposite; ♀ flowers in the spikes usually above the ♂; fruit capsular, dehiscent ..... **Buxus.**
Leaves alternate; ♀ flowers in the spikes usually below the ♂, often separate and single; fruit a berry, indehiscent.....1. **Sarcococca.**

Sarcococca, Lindl.

Glabrous evergreen shrubs. *Leaves* alternate, entire, penni- or tripli-nerved. *Flowers* in short axillary racemes, monoecious, the ♀ below the ♂; bract 1; bracteoles few in ♂, more numerous and decussate in ♀. *Perianth*-lobes 4 in ♂, 4–6 in ♀ in opposite pairs. *Stamens* 4, opposite the perianth-lobes; filaments thick; anthers adnate to their tops, cells introrse. *Ovary* 2–3-celled; ovules 2 in each cell, the raphe dorsal; styles 2, recurved, the inner faces furrowed and papillose. *Fruit* an indehiscent coriaceous or fleshy berry, the endocarp hard. *Seeds* 1–2; testa membranous; albumen fleshy; cotyledons flat, cordate.

Leaves usually distinctly tripli-nerved, from about ·5 in. above the base, lanceolate, long-acuminate at apex, acute at base, up to 6 in. long, 2·5 in. broad; racemes up to 1 in. long .....1. *trinervia.*
Leaves less distinctly tripli-nerved from nearer the base, ovate to ovate-elliptic, shortly and suddenly acuminate at apex, rounded and then acute at base, up to 3 in. long, 1·75 in. broad; racemes about ·5 in. long .....2. *brevifolia.*

1. SARCOCOCCA TRINERVIA, Wt. Ic. t. 1877. *S. saligna* var. *densiflora*, Muell. Arg. *S. pruniformis*, Lindl.; F. B. I. v. 266 *in part*.

   N. Circars, Mahendragiri Hill in Ganjam, 4,500 ft. (Gamble), Daringabadi (Barber), hills of Vizagapatam (A. W. Lushington); W. Ghâts, from Nilgiris southwards. usually at 4,000–7,000 ft., sometimes at low levels, S. Canara (Beddome), usually in forest undergrowth.

   A large evergreen shrub. Bark light brown; wood white, close-grained, like boxwood, sometimes used for walking-sticks.

2. SARCOCOCCA BREVIFOLIA, Stapf in Herb. Kew. *S. saligna* var. *brevifolia*, Muell. Arg.

   W. Ghâts, Nilgiris, on Doddabetta 8,000 ft., in Shola undergrowth.

   An evergreen shrub.

The Box, *Buxus sempervirens*, Linn., is commonly used for edges on the Cinchona Estates in Nilgiris.

Family CXXXV. EUPHORBIACEAE.

Herbs, shrubs or trees, rarely climbers, often with milky juice. *Leaves* alternate or opposite, simple or rarely compound, usually tipulate, often glandular. *Flowers* usually small, often minute, monoecious or dioecious, the inflorescence variable. *Perianth* sually calycine, rarely petaloid, sometimes of both calyx and orolla, sometimes wanting in one or both sexes. *Calyx* inferior, alvate or imbricate, often different in the sexes. *Petals* when resent free, sometimes scale-like, sometimes absent or different n the sexes. *Stamens* various, definite or indefinite; filaments ree or connate; anthers 2-celled, the cells parallel or divaricate, ehiscing longitudinally or sometimes transversely. *Disk* arious, usually annular, entire or lobed, or of free scales or 0. *Ovary* usually sessile, rarely stipitate, usually 3-celled; ovules n each cell 1 or 2, pendulous from the inner angle; style usually s many as the cells, free or more or less connate, erect or preading, the inner faces usually stigmatic. *Fruit* usually capular of 2-valved cocci separating from a persistent axis, sometimes indehiscent or drupaceous, 1-3-celled. *Seeds* attached aterally near to or above the middle of the cell with or without caruncle or arillus; albumen usually copious fleshy, embryo traight, the radicle superior, the cotyledons broad and flat.

Cells of the ovary 2-ovuled except in 1 :— (1–26)

Inflorescence of many pedicelled bracteolate stamens as ♂ flowers surrounding a single pedicelled ♀, the whole contained in a 4–5-lobed involucre :—

Involucre regular or nearly so ..... 1. **Euphorbia.**

Involucre obliquely zygomorphous ..... **Pedilanthus.**

Flowers distinct, not contained in an involucre :—

Leaves simple, alternate :— (2–24)

Petals present, small :— (2–4)

Calyx valvate ; filaments combined in a column :—

Fruit a drupe with 2 pyrenes ; ovary 2-celled .. 2. **Bridelia.**

Fruit a capsule ; ovary 3-celled ..... 3. **Cleistanthus.**

Calyx imbricate ; stamens free ..... 4. **Actephila.**

Petals wanting ; calyx-lobes imbricate in bud :— (5–24)

Disk present, usually conspicuous and of glands :— (5–15)

Flowers, at any rate ♂, in clusters :— (5–14)

Fruit a dry capsule of 3 2-valved cocci :— (5–11)

Calyx-lobes 6 in both ♂ and ♀ :— (5–7)

Stamens 3, the filaments connate :—

Stamens small, not apiculate ; styles short, bifid, sunk in the top of the ovary ..... 5. **Agyneia.**

Stamens elongate, apiculate ; styles combined in a terminal column ..... 6. **Pseudoglochidion.**

Stamens 6, the filaments free ..... 7. **Chorisandra.**

Calyx-lobes 5 in both ♂ and ♀ :—

Stamens 5, the filaments connate .. 8. **Neopeltandra.**

Stamens 3, the filaments connate wholly, in part, or sometimes not at all ..... 9. **Phyllanthus.**

Calyx-lobes 4 in ♂, 6 in ♀ ; stamens 2 or 4, the filaments connate ..... 10. **Reidia.**

Calyx-lobes 4 in both ♂ and ♀ ; stamens 4, the filaments free ..... 11. **Prosorus.**

Fruit a berry :— (12–13)

Fruit small, fleshy, with 6–12 crustaceous seeds ; ovules superposed ; calyx-lobes 5 .... 12. **Kirganelia.**

Fruit large, of 3–6 hard cocci in a fleshy epicarp :—

Calyx-lobes 5–6 ; stamens 3, the filaments connate 13. **Emblica.**

Calyx-lobes 4 ; stamens 4, the filaments free .. **Cicca.**

Fruit dry or fleshy with 6 cocci ; stamens 5, the filaments free, alternating with the disk-glands and surrounding the pistillode ..... 14. **Flueggea.**

Flowers in spikes or racemes, often panicled; ovary 1-celled ..... 15. **Antidesma.**

Disk central, orbicular; stamens 4 to many :—

Ovary 1-celled; drupe 1-seeded ..... 16. **Hemicyclia.**

Ovary 2–4-celled; drupe 2–4-seeded .... 17. **Cyclostemon.**

Disk combined with the calyx-lobes, the 3 stamens in a column :—

Anthers sessile on the angle of the column; calyx of both ♂ and ♀ spreading ..... 18. **Sauropus.**

Anthers adnate to the column; calyx of ♂ turbinate, of ♀ spreading ..... 19. **Breynia.**

Disk wanting :— (20–24)

Stamens connate by their connectives in a column; styles also connate in a column; flowers in clusters 20. **Glochidion.**

Stamens free or rarely connate by their filaments :— (21–24)

Flowers in spikes or racemes :—

Fruit capsular :—

Seeds without an aril; stamens 1–5; ♂ flowers in catkin-like spikes, ♀ in clusters ..... 21. **Aporosa.**

Seeds with an aril; stamens 4–8; flowers in racemose spikes often in fascicles on the trunk 22. **Baccaurea.**

Fruit a drupe with woody endocarp; flowers in axillary racemes; stamens 5 or more .... 23. **Daphniphyllum.**

Flowers: ♂ in clusters, ♀ subsolitary; stamens 2–3 central ..... 24. **Putranjiva.**

Leaves simple, whorled; calyx-lobes 5–6 ..... 25. **Mischodon.**

Leaves trifoliolate; calyx-lobes 5; flowers in panicles of racemes 26. **Bischofia.**

Cells of the ovary 1-ovuled :— (27–57)

Filaments inflexed in bud; ♂ calyx imbricate valvate or nearly open; pistillode 0; indumentum scaly or stellate ..... 27. **Croton.**

Filaments erect, rarely inflexed, but then pistillode conspicuous :— (28–56)

Calyx in ♂ valvate :— (28–45)

Petals present in ♂ flowers :— (28–30)

Calyx 5-lobed, closed in bud then regularly valvate; herbs or undershrubs very stellate-hairy ..... 28. **Chrozophora.**

Calyx irregularly valvate; trees or shrubs :—

Not lepidote or stellate-pilose; pistillode prominent 29. **Agrostistachys.**

Lepidote or stellate-pilose ; fruit drupaceous, indehiscent
30. **Aleurites.**

Petals in ♂ flowers 0 :— (31–45)
Partial inflorescence not involucrate :— (31–44)
Filaments free or shortly connate :— (31–44)
Filaments not branched :— (31–41)
Styles free or only slightly connate :— (31–40)
Anthers not vermiculiform or linear :— (31–39)
Anther-cells pendulous or adnate :— (31–37)
Anthers 2-celled :— (31–35)
Stamens numerous :—
Fruit indehiscent ; styles linear
31. **Trewia.**
Fruit a capsule : styles plumose
32. **Mallotus.**
Stamens 2–9 :—
Filaments inflexed .....33. **Symphyllia.**
Filaments straight, dilated
34. **Coelodepas.**
Filaments slender .....35. **Alchornea.**
Anthers 4-celled or 2-celled and 4-valved :—
Connective produced ; capsule large
36. **Cleidion.**
Connective not produced ; capsule small
37. **Macaranga.**
Anther-cells discrete, ascending, divaricate
Racemes uniformly floriferous ; cocci dehiscing loculicidally.....38. **Claoxylon.**
Racemes interrupted ; cocci dehiscing loculi- and septicidally .....39. **Micrococa.**
Anthers vermiculiform or linear ; styles laciniate
40. **Acalypha.**
Styles connate ; calyx of ♀ accrescent ; stinging climbers .....41. **Tragia.**
Filaments much branched ; staminal bundles indefinite :—
Leaves entire, penninerved :—
Calyx-lobes of ♀ soon deciduous....42. **Homonoia.**
Calyx-lobes of ♀ enlarged after flowering
43. **Lasiococca.**
Leaves palmatilobed .....44. **Ricinus.**
Filaments connate in a column .....**Hevea.**
Partial inflorescence involucrate ; climbers..45. **Dalechampia.**

Calyx in ♂ imbricate :— (46–54)
Petals present in ♂ flowers :— (46–52)
Petals free :— (46–51)
Stamens numerous :— (46–50)
Flowers glomerate-spicate or racemose :— (46–48)
Calyx not or scarcely enlarged in fruit :—
Flowers in ♀ with petals .....46. **Ostodes.**
Flowers in ♀ with no or very minute petals **Codiaeum.**
Calyx enlarged under the fruit :—
Flowers in ♀ with petals .....47. **Dimorphocalyx.**
Flowers in ♀ apetalous .....48. **Blachia.**
Flowers paniculate, the panicles branching dichasially :—
Leaves palmatinerved.....49. **Jatropha.**
Leaves penninerved .....50. **Tritaxis.**
Stamens 3–8, usually 3 .....51. **Trigonostemon.**
Petals connate; leaves palmatinerved; fruit a drupe 52. **Givotia.**
Petals in ♂ flowers 0 :—
Leaves usually deeply lobed; ♂ calyx large, coloured **Manihot.**
Leaves not lobed; ♂ calyx small, not coloured :—
Disk of ♂ outside the stamens; leaves not punctate 53. **Baliospermum.**
Disk-glands large or only peripheric; leaves pellucid-punctate .....54. **Gelonium.**
Calyx of ♂ open or slightly imbricate, usually much reduced; disk 0 :—
Calyx of ♂ 3-lobed; stamens 3 or 2 :—
Seeds carunculate; herbs .....55. **Sebastiania.**
Seeds not carunculate; trees .....56. **Excoecaria.**
Calyx of ♂ 2–3-lobed; stamens 2–3; seeds not carunculate 57. **Sapium.**

1. Euphorbia, Linn.

Herbs, shrubs or small trees of various habit and with copious milky, usually acrid, juice. *Leaves* alternate or opposite, usually entire, often (in the fleshy species) caducous or much reduced; stipules various. *Flowers* monoecious, combined in an inflorescence of many ♂ *florets* surrounding a solitary ♀ and accompanied by many *bracteoles*, usually setaceous, but sometimes combined

in a sheath, sometimes 0; the whole enclosed in a 4–5-lobed turbinate or campanulate *involucre*, having also between the *lobes* at their sinuses thick *glands*, which have sometimes horns and sometimes a petaloid spreading *limb*. *Perianth* 0 or of minute scales. *Stamen* in ♂ florets solitary, the filament jointed on a pedicel; anther 2-celled, erect, the cells usually subglobose, opening longitudinally. *Floret* of ♀ a 3-celled ovary on an often decurved pedicel; ovule solitary in each cell; styles 3, free or connate; stigmas simple or 2-fid. *Fruit* a capsule of 3 2-valved *cocci* separating elastically from a persistent axis, and dehiscing ventrally or both ventrally and dorsally. *Seeds* albuminous; testa more or less crustaceous, often with a caruncle; cotyledons flat; radicle superior.

Herbs, prostrate or ascending; leaves opposite; glands of involucre 4–5, usually with a petaloid limb :—

Erect and dichotomously branching; limb of gland more or less conspicuous, petaloid :—

Floral leaves distichous, imbricate, enclosing the involucres which are solitary or 2–3 only :—

Limb of gland entire or sinuate: leaves cordate, usually unequally, at base, minutely areolate-reticulate, serrulate :—

Limb of gland scarcely ·05 in. long; plants nearly or quite glabrous; leaves elliptic-oblong, obtuse :—

Cocci obtusely keeled, hirsute or glabrous; seeds obtusely 4-angled, transversely furrowed or glabrous; limb white ..... 1. *pycnostegia.*

Cocci keeled and angled at base, nearly glabrous; seeds ovoid, papillose; limb pink ..... 2. *zornioides.*

Limb of gland ·1 in. long, pink; plant with soft spreading hairs; leaves elliptic or orbicular, obtuse, the floral much imbricate; cocci rounded, hirsute; seeds 4-angled, transversely furrowed ..... 3. *elegans.*

Limb of gland pectinately laciniate; seeds transversely furrowed :—

Limb of gland glabrous or nearly so: leaves very small; cocci hirsute; seeds brown ..... 4. *fimbriata.*

Limb of gland with long hairs; leaves about ·5–·75 in. long, obliquely ovate-cordate, obtuse, serrulate; cocci rounded, hirsute; seeds white ..... 5. *cristata.*

Floral leaves not distichous and not imbricate :—

Limb of gland multifid almost to the base, the gland itself

minute; leaves membranous, elliptic or oblong, obtuse, distantly serrulate, up to ·75 in. long; cocci glabrous, keeled; seeds with 3–4 parallel furrows .....6. *longistyla.*

Limb of gland entire, not multifid :—

Cocci with 2 dorsal wings; seeds obtusely 4-angled, papillose: involucres in small cymes, the limb of the gland rounded, white; leaves linear-oblong, mucronate, up to 1 in. long, ·25 in. broad .....7. *notoptera.*

Cocci not winged :—

Involucres in subcorymbose terminal cymes; limb of gland broadly rounded, pink or white; leaves linear-oblong, coriaceous; obtusely acute, unequally cordate at base, up to 1 in. long, ·2 in. broad; cocci glabrous, keeled 8. *linearifolia.*

Involucres in terminal and axillary cymes :—

Dwarf glabrous seashore shrub with fleshy branches and leaves, the latter elliptic, obtuse, unequally rounded at base, up to 1 in. long, ·5 in. broad; cymes corymbose, spreading, much bracteate: glands oblong, the limb very small or 0; cocci glabrous; seeds globose, smooth 9. *Atoto.*

Erect slender inland herbs; not fleshy; seeds with shallow furrows :—

Cymes not capitate; plant nearly glabrous: leaves thin, glaucous, elliptic oblong or obovate, obtuse, serrulate, up to 1 in. long, ·5 in. broad; limb of gland small, retuse, white or pink; cocci hispid; seeds reddish-glaucous .....10. *hypericifolia.*

Cymes capitate, often in pairs; plants with hispid often yellowish hairs; leaves obliquely elliptic or lanceolate, acute, serrulate, up to 1·5 in. long, ·5–·75 in. broad, pale beneath; limb of stalked gland minute or 0; cocci appressed pubescent; seeds reddish .....11. *hirta.*

Erect herbs, also with many prostrate or spreading branches :—

Limb of gland pink, the 2 upper large obliquely oblong, obtuse or notched, the 2 lower small; leaves green, obliquely obovate or linear-spathulate, crenulate at tip, up to ·5 in. long, ·25 in. broad; cocci obtusely keeled, minutely papillose; seeds with shallow furrows .....12. *rosea.*

Limb of gland white, all subequal, rounded, sometimes 0; leaves green, but often with a red spot, elliptic oblong or obovate, obtuse, oblique at base, up to ·5 in. long, ·2 in. broad; cocci keeled, glabrous or slightly pubescent; seeds smooth..13. *corrigioloides.*

Prostrate herbs with very small leaves; involucres solitary or in small axillary cymes; limb of gland minute or 0:—

Stems hispidly hairy; capsules pubescent or hirsute; leaves areolate-reticulate:—

Cocci rounded or only slightly obtusely keeled, covered with appressed stiff hairs; seeds 4-angled with faint furrows; leaves oblong or ovate, crenulate at tip, obliquely subcordate at base, up to ·25 in. long, the nerves obscure..14. *thymifolia.*

Cocci prominently keeled, with stiff spreading hairs on the keels; seeds 4-angled, with deep furrows; leaves elliptic or obovate, crenulate, oblique at base, up to ·3 in. long, 3-nerved, the nerves all prominent .....15. *prostrata.*

Stem and capsules glabrous, the latter obtusely keeled; seeds obtusely 4-angled, glabrous, sometimes faintly furrowed; leaves elliptic or obovate, rounded or emarginate, oblique at base, rarely over ·15 in. long, the nerves obscure ....16. *microphylla.*

Shrubs or trees or plants with thickened underground stem, the branches often angular and with stipular spines; glands of involucre without a petaloid limb:—

Stems not developed above ground, stout and cylindric, 6–18 in. or more long; leaves radical, obovate, cuneate, early deciduous; scapes erect, dichotomous, bracteate; involucre hemispheric, the lobes lacerate-multifid; glands 5, oblong; capsule glabrous; seeds ovoid, smooth .....17. *acaulis.*

Stems well developed above ground:—

Branches spreading, unarmed, cylindric; leaves 0 or small and linear-oblong, deciduous; involucres pedicelled, clustered in the axils of the branchlets; glands peltate; cocci subglobose, smooth, ·3 in. long; seeds ovoid, smooth .....18. *Tirucalli.*

Branches thick, fleshy, armed with stipular spines:—

Main stems practically none but many branches from the base up to even 7 ft. high, 2 in. in diam., terete, smooth; spines in pairs from large conical tubercles, in spirals, the spines ·25–·5 in. long, red, sharp, often with 2 smaller ones above; leaves small, fleshy, suborbicular, ·3–·5 in. long, deciduous; glands oblong; capsule red, sharply angled.....19. *caducifolia.*

Main stem present, thick and tree-like :—

Leaves large, oblanceolate, usually at least 6 in. long; involucres usually in threes on a short fleshy peduncle, the lobes fimbriate, the glands transversely oblong :—

Branches cylindric with pairs of straight spines inserted on flat corky bases, arranged in vertical lines; leaves obtuse ..... 20. *Nivulia.*

Branches more or less angular with small pairs of spines on small corky bases, arranged in spiral lines; leaves shortly acute ..... 21. *neriifolia.*

Leaves small, usually very early deciduous; branches angular :—

Styles simple :—

Branchlets 3-winged with straight spines in pairs; leaves obovate, spathulate, mucronate, up to 2 in. long, ·75 in. broad; bracteoles sheathing, laciniate 22. *trigona.*

Branchlets 5-winged with narrow sharp spines; leaves oblanceolate, acute, mucronate, up to 2 in. long, ·5 in. broad; bracteoles slender, fimbriate at tip 23. *Cattimandoo.*

Styles bifid at apex :—

Branchlets thick and broad 3–5-winged, with sharp spines; leaves few, very small; glands fleshy, thick, spongily pitted, bracteoles sheathing, deeply laciniate 24. *antiquorum.*

Branchlets rather slender, much twisted, 3–5-winged, with sharp spines, the wings thin, foliaceous; leaves minute, ovate; glands large, hard and thin, glabrous; bracteoles sheathing, fimbriate at tip ..... 25. *tortilis.*

Herbs with erect stems umbellately branched above, the lower leaves or sometimes all alternate, the upper opposite; glands of involucre without a petaloid limb :—

Glands of the involucre 2-horned; capsule smooth; seeds carunculate :—

Seeds with a white leprous tuberculate testa; leaves linear or linear-lanceolate, 1–1·5 in. long, ·1–·2 in. broad, the floral leaves shorter and broader in proportion; lobes of the involucre short, ovate, ciliolate ..... 26. *dracunculoides.*

Seeds with a smooth, bluish-grey to black testa; leaves linear-lanceolate or oblanceolate, 2–4 in. long, ·25–·75 in. broad, the

floral leaves broadly ovate-cordate, acute, mucronate; lobes of the involucre long, subquadrate, ciliate .....27. *Rothiana.*

Glands of the involucre not horned :—

Glands peltate; cocci rounded, smooth; leaves oblanceolate, acute, serrate, the upper larger, up to 1·5 in. long, those near the involucres ovate to cordate; lobes of the involucre narrow, ciliate, longer than the glands .....28. *peltata.*

Glands oblong; capsules smooth, the cocci rounded; seeds reticulate, carunculate; leaves obovate or spathulate, obtuse, serrulate, the floral larger, up to 2 in. long; lobes of the involucre fimbriate .....29. *helioscopia.*

1. EUPHORBIA PYCNOSTEGIA, Boiss.; F. B. I. v. 246.

W. Ghâts, hills of S. Canara and Malabar.

A slender branching herb, glabrous except the floral internodes and capsule, the leaves up to 1·5 in. long, ·5 in. broad, floral leaves smaller, ovate; cocci hirsute.

Var. *laxa*, Boiss. Floral heads more open, cocci glabrous, also seeds.

Bababudan Hills of Mysore, at 5,000 ft. (Talbot, Meebold).

2. EUPHORBIA ZORNIOIDES, Boiss.; F. B. I. v. 246.

Bababudan Hills of Mysore at 3,500 ft. (Meebold), Anamalais (Beddome).

A slender glabrous herb, with woody stem, the leaves narrow, mucronate, floral leaves small, ovate, gradually smaller upwards, ciliate on the edges.

3. EUPHORBIA ELEGANS, Spr.; F. B. I. v. 146.

N. Circars and Deccan from Godavari to Kurnool, in shady places in deciduous forest.

An erect herb or undershrub with conspicuous floral leaves and pink flowers, the leaves scarcely 1 in. long.

4. EUPHORBIA FIMBRIATA, Heyne in Roth Nov. Sp. Pl. 227. *E. cristata*, Hook. f. in F. B. I. v. 247 *in part.*

Deccan, Sakrabile in Mysore (Barber); Tinnevelly Ghâts (Beddome).

A dwarf undershrub with thick rootstock and many short branchlets, the involucre very villous.

5. EUPHORBIA CRISTATA, Heyne; F. B. I. v. 247.

Deccan and Carnatic, from the Kistna river southwards, west to the E. slopes of the Ghâts, in forest undergrowth, up to 3,000 ft.

A straggling undershrub with thick rootstock.

6. EUPHORBIA LONGISTYLA, Boiss.; F. B. I. v. 247.
Deccan, in the Ceded Districts, up to 2,000 ft. (Heyne, Wight, Gamble).
An erect delicate herb reaching 10 in. in height, with slender root and numerous filiform branches, the long styles conspicuous.

7. EUPHORBIA NOTOPTERA, Boiss.; F. B. I. v. 247.
W. Coast in rice-fields and other cultivated land, on laterite soil in S. Canara (Fischer).
A slender erect herb with narrow, usually deflexed leaves.

8. EUPHORBIA LINEARIFOLIA, Roth; F. B. I. v. 249.
Deccan, at Cumbum in Kurnool (Bourne) also, but without geographical locality (Heyne and Wight).
A glabrous glaucous herb with thick rootstock and branches. Roth says that the limb is pink with a red spot.

9. EUPHORBIA ATOTO, Forst.; F. B. I. v. 248.
W. Coast, in S. Canara, Malabar and Travancore, on the sea-coast.
A fleshy shrub with long stout rootstock and stout much-branched stems.

10. EUPHORBIA HYPERICIFOLIA, Linn.; F. B. I. v. 249.
N. Circars, Deccan and Carnatic, west to the E. slopes of the Ghâts, up to 3,000 ft., common.
A slender herb reaching 1–2 ft. high.

11. EUPHORBIA HIRTA, Linn. *E. pilulifera*, Linn.; F. B. I. v. 250.
All plains Districts, especially on roadsides and waste land, common.
A straggling ascending hispid herb reaching 1–2 ft. high.

12. EUPHORBIA ROSEA, Retz; F. B. I. v. 251.
N. Circars, coast of Ganjam; S. Deccan and Carnatic, on sandy soils, especially near the coast.
A herb with long rootstock and many prostrate branches, the styles long and conspicuous. The coast form (*E. auricularia*, Boiss.) has the two upper limbs of the glands shorter and broader and the leaves more rounded and fleshy.

13. EUPHORBIA CORRIGIOLOIDES, Boiss.; F. B. I. v. 251.
S. Deccan and Carnatic usually near the coast, but also inland to Bellary.

A herb with stout rootstock and many branches which are often long and trailing with leaves in distinct pairs, often conspicuous with a red blotch.

14. EUPHORBIA THYMIFOLIA, Linn.; F. B. I. v. 252.
All plains Districts and on hills in Deccan and Carnatic at low elevations, often a roadside and garden weed.
An annual prostrate herb.

15. EUPHORBIA PROSTRATA, Ait.; F. B. I. v. 266.
Deccan and Carnatic, occasionally, usually probably as a weed in gardens. An introduced plant, native of W. Indies.
A prostrate herb.

16. EUPHORBIA MICROPHYLLA, Heyne; F. B. I. v. 252.
Circars, Deccan and Carnatic, especially near the sea and on river banks.
A glabrous herb with prostrate branches, spreading star-like from the root.

Var. *nilagirica*. *E. nilagirica*, Miq.; F. B. I. v. 265. A rather larger plant with larger leaves and more sharply keeled cocci.
Nilgiri Hills (Hohenacker), probably at low levels in dry places.

17. EUPHORBIA ACAULIS, Roxb. *E. fusiformis*, Buch.-Ham. in Don Prodr. 62; F. B. I. v. 257.
Bababudan Hills of Mysore (Law).
A dwarf unarmed glabrous herb, flowering in the hot season, the leaves up to 9 in. or more long, the tuber often very large, even to 2 ft.

18. EUPHORBIA TIRUCALLI, Linn.; F. B. I. v. 254.
Most plains Districts, naturalized and cultivated as a hedge plant, native of tropical Africa. Milk Bush.
A large shrub or small tree. Flowers very small, the bracteoles among the ♂ laciniate at tip; bark greenish-brown; wood white or grey, moderately hard, said to give a good powder charcoal. Vern. *Hind.* Sehnd; *Tam.*, *Mal.* Tiru Kalli.

19. EUPHORBIA CADUCIFOLIA, Haines in Ind. For. xl. 154; Fischer in Kew Bull. 1925, 341.
Deccan, hills of Palnád in Guntur, hills of Kurnool and Cuddapah, among rocks (Fischer).
A much-branched thorny shrub with smooth green bark. Vern. *Tel.* Kattai-jemadu.

20. EUPHORBIA NIVULIA, Buch.-Ham.; F. B. I. v. 255; Wt. Ic. t. 1862.

N. Circars and Deccan to Mysore and Coimbatore, on rocky hills in dry open forests; often also cultivated.

A tree with straight trunk reaching 10–30 ft., the branches whorled. Wood white, soft, even-grained. The milky juice is used in medicine. Vern. *Tam.* Kalli; *Kan.* Yelli Kalli.

21. EUPHORBIA NERIIFOLIA, Linn.; F. B. I. v. 255.

Cultivated and sometimes run wild, chiefly in Northern Districts.

A small tree 6–15 ft. high with whorled branches.

22. EUPHORBIA TRIGONA, Haw.; F. B. I. v. 256 *in part*; Wt. Ic. t. 1863.

Deccan, on dry rocky hills.

A small tree with thick trunk reaching 6–7 ft., the involucres in dichasioid cymes of 3, the middle one with ♀ flowers, the others usually only ♂. The cocci are more or less compressed, the seeds smooth.

23. EUPHORBIA CATTIMANDOO, W. Elliot in Wt. Ic. t. 1993. *E. trigona*, Haw.; F. B. I. v. 256 *in part*.

N. Circars, dry hills about Vizagapatam (W. Elliot); Deccan, hills of Kistna and Kurnool.

An erect shrub or small tree, giving an abundant milk which hardens to a kind of gutta-percha.

24. EUPHORBIA ANTIQUORUM, Linn.; F. B. I. v. 255; Wt. Ic. t. 897.

Low hills and rocky ground in most dry Districts, also commonly cultivated as a hedge plant.

A small tree, reaching 25 ft. high, the involucres in short cymes of 3, the cocci compressed. Vern. *Hind.* Tidhara-Sehnd; *Tam.* Sadura-Kalli.

25. EUPHORBIA TORTILIS, Rottl. *ex* Wt. Ic. t. 898; F. B. I. v. 256. *Tel.* Pedda jamadu.

Carnatic, from Nellore to Tinnevelly, on dry hills.

An erect shrub with thin-winged branchlets bearing involucres in cymes of 3.

26. EUPHORBIA DRACUNCULOIDES, Lamk.; F. B. I. v. 262.

N. Circars and Deccan, on dry waste lands and in cultivated ground in the plains.

A much-branched glaucous herb with very narrow leaves.

27. EUPHORBIA ROTHIANA, Spr.; F. B. I. v. 263; Wt. Ic. t. 1864.

N. Circars, Mahendragiri Hill in Ganjam, 4.000 ft. (Fischer); Deccan, hills of Mysore and Coimbatore; W. Ghâts, in all Districts, at 4,000–7,000 ft., usually in damp places.

An erect glabrous glaucous herb, the flowering branches whorled with conspicuous floral leaves.

Var. *pubescens*, Boiss. Branchlets and leaves softly pubescent. Coorg (Hohenacker).

28. EUPHORBIA PELTATA, Roxb.; F. B. I. v. 262.

Interior of the Coromandel Coast (Roxburgh), see Fl. Ind. and Icon. 1248 in Herb. Kew.

A small annual erect herb.

29. EUPHORBIA HELIOSCOPIA, Linn.; F. B. I. v. 262.

Nilgiri Hills, introduced and run wild, native of Europe and temperate Asia. Sun Spurge.

An erect annual herb.

Euphorbia pulcherrima, Willd., the Poinsettia, is a well-known ornamental garden shrub with bright crimson or occasionally yellow or white floral leaves. *E. heterophylla*, Linn., is an annual herb from Tropical America, which is often found as a weed in Indian gardens. It has narrow floral leaves, green near the apex and nearly reddish at base. *E. splendens*, Boj., is a small prickly very much branched shrub with showy crimson flowers, common in gardens in the plains. It is a native of Madagascar.

2. Bridelia, Willd.

Shrubs or trees, sometimes climbing; stems often spinose. *Leaves* alternate, entire, usually with prominent nerves and transverse nervules; stipules early deciduous. *Flowers* small, monoecious or dioecious, in axillary or spicate clusters, sessile or shortly pedicelled; bracts small, scale-like. *Calyx* of 5 valvate lobes. *Petals* 5, small, alternate with the calyx-lobes, in ♂ usually stalked, cucullate and dentate, in ♀ spathulate. *Disk* flat, the ♂ with an annular rim, the ♀ with an inner corona, erect and enclosing the ovary. *Stamens* 5, on an erect gonophore, the filaments radiating from it and surrounding a pistillode, anther-cells parallel. *Ovary* 2-celled; ovules 2 in each

cell; styles 2, free or shortly united, forked or subentire. *Fruit* a drupe, with 1–2 usually single-seeded pyrenes. *Seed* with usually fleshy albumen; cotyledons thin, usually broad and truncate or emarginate; radicle superior.

Trees or shrubs; fruits globose or didymous, the pyrenes more or less furrowed; stipules narrow:—

Main nerves strong, straight, parallel, joining a marginal thickened one, more than 15 pairs, cross-nervules also many and parallel:—

Flowers in clusters in spikes, monoecious, the ♀ much larger than the ♂; leaves chartaceous, oblong or obovate, acute obtuse or even retuse at apex, usually obtuse at base, glabrous or puberulous beneath, up to 9 in. long, 4 in. broad, main nerves often forked near the margin; drupe black, globose, about ·25 in. in diam., the pyrene furrows curved and deep .....1. *retusa*.

Flowers in clusters in the leaf-axils, pedicelled or not, dioecious; leaves coriaceous, the main nerves close and regular; stipules long-acuminate, deciduous:—

Leaves elliptic-oblong, obtuse or emarginate at apex, obtuse or cordate at base, brown-tomentose beneath, up to 5 in. long, 2·5 in. broad; drupe black, depressed globose, ·25 in. in diam., the pyrene furrows deep, the ridges branching from the middle one and curved .....2. *Roxburghiana*.

Leaves oblong, acute or obtusely acute at apex, usually acute at base, glabrous and cinereous-glaucous beneath, up to 3·5 in. long, 1·25 in. broad; drupe globose, ·3 in. in diam., the pyrene furrows rather shallow, the ridges curved

3. *cinerascens*.

Main nerves not markedly straight or parallel, often branched, but always eventually joining a marginal thickened one, less than 15 pairs, cross-nervules also more or less parallel; flowers monoecious, very small:—

Leaves oblong-lanceolate or -oblanceolate, acute at apex, acute or obtuse at base, glaucous and pubescent beneath, up to 4 in. long, 1·5 in. broad; drupe globose, black, ·2 in. in diam., the pyrene furrows deep, the ridges radiating from a prominent central one

4. *tomentosa*.

Leaves rhombic-obovate or sometimes -oblanceolate, acute at apex, long-cuneate at base, usually glabrous, up to 4·5 in. long, 2·5 in. broad; drupe globose, ·25 in. in diam., the pyrene furrows shallow, the ridges rounded, curving from a central one

5. *montana*.

Climbers; fruits oblong, the pyrenes smooth; flowers in long axillary or terminal spikes with small leaves and zig-zag rachises, usually monoecious, but the ♂ and ♀ on separate spikes:—

Disk of the ♀ flowers with a ring of bristles at the base within, the calyx enlarged in fruit; leaves elliptic-ovate or -obovate, acute at apex, rounded at base, fulvous tomentose beneath, up to 4 in. long, 2 in. broad, the main nerves 10–12 pairs, parallel, joining a marginal one, the transverse nervules also regular and parallel; drupe black, ·5 in. long ..... 6. *stipularis.*

Disk of the ♀ flowers without a ring of bristles at the base within, the calyx not enlarged in fruit; leaves elliptic, obtuse at apex, rounded or cordate at base, fulvous-pubescent beneath, up to 5 in. long, 2·5 in. broad, the main nerves 7–10 pairs, parallel, joining a marginal one, the transverse nervules also more or less parallel; drupe black, ·3 in. long ..... 7. *scandens.*

1. BRIDELIA RETUSA, Spreng.; F. B. I. v. 268 *in part*; Bedd. Fl. t. 260; Brand. For. Fl. t. 55. *Cluytia spinosa*, Roxb. Cor. Pl. t. 172.

   All Forest Districts, especially in the N. Circars and in deciduous forests, though usually by streams and in ravines, in the hills up to 3,500 ft.

   A small or moderate-sized tree, with conical thorns on the stems and branches when young. Bark grey or brown; wood grey to olive-brown, with a pretty silver grain, useful and durable. Vern. *Hind.* Kaj, Kassi; *Ur.* Kosi; *Tel.* Koramaddi, Verri Karaka; *Tam.* Mulu Maruthu; *Mal.* Mukkayini; *Kan.* Asana.

2. BRIDELIA ROXBURGHIANA, Gehrm. in Engl. Jahrb. xli, Beibl. 95, 30. *B. retusa*, Spr., var. *Roxburghiana*, Hook. f.; F. B. I. v. 268.

   W. Ghâts, in all Districts of the hills up to 5,000 ft., especially on the E. side; hills of Mysore and N. Coimbatore; Shevaroy Hills of Salem.

   A large tree, probably thorny when young, the branches with shining bark, the branchlets fulvous-tomentose.

3. BRIDELIA CINERASCENS, Gehrm. l. c. *B. retusa*, Spr., var. *glauca*, Hook. f.; F. B. I. v. 268.

   Deccan, Palkonda Hills of Cuddapah (Fischer), Veligonda Hills of Nellore (M. S. Ramaswami), Kambakam Hills of Chingleput (K. Rangachari)

A moderate-sized tree, apparently thorny when young, the flowers greenish-yellow, the drupe purple-black

4. BRIDELIA TOMENTOSA, Blume; F. B. I. v. 271.
   N. Circars, in forest, Ganjam (Gamble); Palkonda Hills of Vizagapatam (Sir W. Elliot); Annavaram in Godavari (K. Rangachari).
   A large shrub or small tree with nearly black slender branchlets, the leaves with about 10-12 pairs of curved parallel unbranched main nerves.
5. BRIDELIA MONTANA, Willd.; F. B. I. 269 *in part only*, Roxb. Cor. Pl. t. 171. *B. Hamiltoniana*, Wall.; F. B. I. v. 271.
   N. Circars, Ganjam to Kistna in dry forests; Deccan, hills of Cuddapah and Kurnool, up to 3,000 ft.
   A large much-branching shrub or small tree, the leaves rather thin and large, and the stem tree-like in moister or more shady places, the leaves thick and small and often yellowish and the stems bushy in open dry ones, the main nerves very oblique, 6 to 10 pairs, usually branched near the margin. Vern. *Tel.* Pantenga.
6. BRIDELIA STIPULARIS, Blume; F. B. I. v. 270, *in part. Cluytia scandens*, Roxb. Cor. Pl. t. 173, *not good.*
   N. Circars, Palkonda Hills of Vizagapatam (J. Campbell, Gamble), Lamsingi Hills (A. W. Lushington, Rangachari).
   A large climbing shrub, with fulvous-tomentose branches, often thorny when young, the leaves on flowering shoots small but often wanting.
7. BRIDELIA SCANDENS, Gehrm. *B. stipularis*, Hook. f.; F. B. I. v. 270 *in part, not of* Blume.
   W. Ghats, S. Canara and Mysore to Travancore, up to 3,000 ft.
   A large climbing shrub with thorny stems and branches, the flowering spikes often long and distichous with small leaves.

3. Cleistanthus, Hook f.

Trees or shrubs. *Leaves* alternate, bifarious, entire. *Flowers* monoecious, small, in axillary clusters or spikes of clusters, sessile or the ♀ pedicelled. *Calyx* of 5 or sometimes 6 valvate lobes, in the ♀ cupular under the ovary. *Petals* alternate with

the calyx-lobes, minute. *Disk* in ♂ flat or pulvinate, in ♀ with an inner corona, more or less enclosing the ovary. *Stamens* 5 or 6, on an erect gonophore, the filaments rising from it and enclosing a lobed pistillode; anther-cells parallel. *Ovary* 3-celled, usually with long hairs; ovules 2 in each cell; styles 3, free, bifid. *Fruit* a sessile or stipitate capsule with 3 2-valved cocci. *Seed* without aril or caruncle; albumen copious or scanty; cotyledons thin or fleshy, often folded.

Capsule large, ·75–1 in. in diam., hard and woody, dark brown, shining; seed globose; calyx-lobes lanceolate, ·25 in. long; petals minute, linear; leaves elliptic obovate or orbicular, often retuse at apex, up to 4·5 in. long, 3 in. wide; ovary glabrous.....1. *collinus.*

Capsule small, less than ·5 in. in diam.; ovary villous:—

Flowers in clusters in axillary spikes; seed heart-shaped; calyx-lobes ·1 in. long; petals minute, obovate; leaves ovate or lanceolate, acuminate at apex, acute or rounded at base, glabrous, up to 3·5 in. long, 1·5 in. broad .....2. *patulus.*

Flowers in axillary clusters:—

Branches slender; calyx-lobes ·1 in. long; petals minute, ovate; leaves lanceolate, long-acuminate, glabrous, up to 4·5 in. long, 1·5 in. broad, the main nerves irregular, branched and reticulate, stipules very small .....3. *travancorensis.*

Branches rather thick, rufous-villous; calyx-lobes 1·25 in. long; petals spathulate; leaves oblanceolate, acuminate, glaucous and thinly pubescent beneath, up to 6 in. long, 1·75 in. broad, main nerves arched, 6–10 pairs, stipules linear-lanceolate, ·2 in. long .....4. *malabaricus.*

1. CLEISTANTHUS COLLINUS, Benth.; F. B. I. v. 274. *Cluytia collina*, Roxb. Cor. Pl. t. 169.

N. Circars, common; Carnatic, in most Districts, in dry forests; Deccan, especially Hyderabad; Malabar (Bournes). A small deciduous tree. Bark dark brown, rough; wood dark reddish-brown, hard and strong, valuable for house-posts and fences. The outer crust of the capsule is poisonous and used to kill fish. Vern. *Hind.* Garrar; *Ur.* Korada; *Tel.* Korei, Wodesha; *Tam.* Wodayu, Wodan.

2. CLEISTANTHUS PATULUS, Muell. Arg.; F. B. I. v. 279, *Amanoa indica*, Wt. Ic. t. 1911.

N. Circars, in Kallikota (Prain), Palkonda Hills of Vizagapatam (Gamble); Deccan, in Mysore, Kistna and Cuddapah

(Beddome); Carnatic, Kambakam Hills in Chingleput, hills of Tinnevelly (Rangachari), chiefly in ravines or dry evergreen forest.

A small or moderate-sized tree with horizontal branches. [illegible] colour of dry rose leaves" (Roxb.), hard and close-grained. The seeds have very thin albumen and large fleshy truncate cotyledons.

3. CLEISTANTHUS TRAVANCORENSIS, Jablonszky in Engl. Pflanzenreich iv. 147. viii. 21.

W. Ghâts, evergreen forests of Travancore at 2,500 ft. (Bourdillon).

A small tree.

4. CLEISTANTHUS MALABARICUS, Muell. Arg.; F. B. I. v. 276.

W. Ghâts, evergreen forests from the Gairsoppa Falls (Talbot) to Travancore (*fide* Bourdillon in 'Trees Trav.'), at 1,000–3,000 ft.

A large shrub or small tree with fulvous-hairy capsules.

4. Actephila, Blume.

Trees or shrubs. *Leaves* alternate, usually large, entire; stipules deciduous. *Flowers* monoecious or dioecious, ♂ in axillary clusters, short-pedicelled, ♀ solitary or few together, long-pedicelled, bracts small. *Calyx*-lobes 5, imbricate, in ♂ small and rounded, in ♀ longer and oblong or lanceolate, often unequal. *Petals* small, inserted under the disk, in ♂ oblong, in ♀ rounded. *Disk* broad, entire or lobed. *Stamens* 3–6 inserted on the disk, filaments shortly combined at the base in a gonophore enclosing a 3-cleft pistillode. *Ovary* sessile, 3-lobed; ovules 2 in each cell; styles short, free or connate at the base, entire or bifid. *Fruit* a hard septicidal capsule of 3 cocci. *Seeds* usually solitary in the cocci, 3-gonous, rounded on the outer face, flat on the 2 inner; testa loose and fragile, often with an inner one membranous; albumen 0 or very scanty; cotyledons fleshy, unequal, the interior one smaller.

ACTEPHILA EXCELSA, Muell. Arg.; F. B. I. v. 282. *A. neilgherrensis*, Wt. Ic. t. 1910.

W. Ghâts, most Districts, in evergreen forests, and Shola woods, up to 6,000 ft.; Bababudan Hills of Mysore.

A small tree reaching a height of 25 ft., with greyish-brown bark. Leaves somewhat coriaceous, shining, variable,

lanceolate obovate or oblanceolate, acute, glabrous, up to 7 in. long, 3 in. broad; capsules depressed globose up to 1·5 in. in diameter. The Mysore specimens agree best with Dalzell's type; the rest are all Wight's *neilgherrensis*, possibly distinct.

5. Agyneia, Vent.

Glabrous herbs; stems often angular or compressed. *Leaves* small, alternate, entire; stipules acuminate. *Flowers* minute, monoecious, ♂ in axillary clusters, ♀ larger, solitary; bracts numerous, stipule-like. *Calyx*-lobes 6, ♂ gland-dotted and white-margined, hooded on the back, ♀ acute, dotted but hardly margined. *Petals* 0. *Disk* in ♂ 6-lobed, in ♀ 0. *Stamens* 3, central, connate, the filaments combined in a gonophore column; cells parallel, extrorse. *Ovary* ovoid, 3-celled, truncate; ovules 2 in each cell; styles 3, very short, bifid, sunk in the top of the ovary. *Fruit* a capsule, splitting into 3 2-valved cocci. *Seeds* 6, slender, curved, with an elongated hilum; testa double, outer white, corky, inner membranous; albumen fleshy; embryo curved, the cotyledons flat.

AGYNEIA BACCIFORMIS, A. Juss.; F. B. I. v. 285; Wt. Ic. t. 1893.

East Coast, in grassy pastures near the sea.

An annual or biennial herb with straggling branches and small oblong elliptic or obovate leaves about ·5 in. long, the capsules ovoid obtuse ·25 in. long.

6. Pseudoglochidion, Gamble.

Evergreen trees or shrubs. *Leaves* alternate, bifarious, entire, very shortly petioled. *Flowers* small, dioecious, in axillary clusters. *Calyx* in ♂ flowers of 6 biseriate imbricate lobes; in ♀ also 6-lobed, but smaller. *Petals* 0. *Disk* in ♂ flowers conspicuous, of 6 fimbriate glands, in ♀ annular, crenate. *Stamens* 3, erect, slightly joined by their connectives or free, the filaments connate in a short column; anthers extrorse, the cells dehiscing longitudinally; the connective produced in an apiculus. Ovary ovoid, 3-celled; ovules 2 in each cell; styles connate in a cylindric column, minutely 6-toothed at apex. *Capsule* 3–4-celled; depressed. *Seeds* trigonous, rounded on the back, often pitted on the faces; cotyledons fleshy, unequal.

PSEUDOGLOCHIDION ANAMALAYANUM, Gamble in Kew Bull. 1925, 330.

W. Ghâts, Anamalai Hills, about 4,000 ft. (Barber, Fischer).

A small tree reaching a height of 15 to 20 ft., the leaves lanceolate, up to 3·5 in. long, 1·25 in. broad, regularly nerved, glaucous beneath; the capsule 3–4-lobed, glabrous and ·3–·4 in. broad.

7. Chorisandra, Wight.

Shrub, branchlets pale and rough. *Leaves* membranous, glabrous, pinnately arranged on short slender branchlets; stipules minute. *Flowers* dioecious or monoecious, minute, ♂ in dense axillary fascicles with short filiform pedicels; ♀ also axillary, with long slender pedicels. *Calyx*-lobes 6, smaller and more rounded in ♂ than in ♀. *Disk* flattened, with 6 depressed lobes alternating with the calyx-lobes. *Stamens* 6, erect, with long free slender filaments; anthers short, the cells dehiscing longitudinally. *Ovary* 3-celled; ovules 2 in each cell, pendulous from the middle of the axis; style short, 3-lobed, the lobes bifid with recurved branches. *Fruit* a 3-celled papery capsule, splitting into 6 valves, but often only 3-seeded. *Seeds* small; testa loose; cotyledons small in rough albumen.

CHORISANDRA PINNATA, Wt. Ic. t. 1994.

N. Circars, Deccan and Carnatic, from Vizagapatam southwards to Madras, westwards to Cuddapah and Kurnool. It is common and more or less gregarious on laterite soils, especially in hollows to the W. of the Pulicat Lake.

A low branching shrub with very pale rough bark, hard wood and small ovate or elliptic very thin and easily detached leaflets.

8. Neopeltandra, Gamble.

Slender undershrubs. *Leaves* alternate, membranous; stipules small, ciliate, caducous. *Flowers* axillary, monoecious, ♂ in short racemes covered with imbricating ciliate bracts, ♀ from below them, solitary, long-pedicelled. *Calyx*-lobes 5, imbricate. *Disk* saucer-like, broad, lining the inside of the calyx. *Stamens* 5, the filaments connate below in a column, free above and spreading; anthers 2-celled, dehiscing longitudinally; pistillode 0. *Ovary* 3-celled; ovules 2 in each cell, pendulous; styles 3, bifid. *Fruit* a 3-celled small capsule, the cocci thinly crustaceous, splitting

into two. *Seeds* 2 or usually only 1 in each cell; testa crustaceous, prominently pitted; albumen fleshy; cotyledons flat, elliptic, leafy, the radicle as long and curved.

Leaves ovate- or elliptic-lanceolate, long and sharply acuminate, acute or rounded at base, up to 6 in. long, 2 in. broad, main nerves 6–8 pairs; ♂ flowers with ovate ciliate bracts, ♀ solitary with pedicel about 1 in. elongating to 3 in. in fruit; capsules ·25 in. broad; seed curved ·65 in. long, obscurely pitted ..... 1. *longipes.*
Leaves elliptic or ovate, acute at apex, rounded or acute at base, up to 2·5 in. long, 1·5–2 in. broad, main nerves 4–6 pairs, slender; ♂ flowers with lanceolate bracts; ♀ solitary, pedicels about ·5 in., longer in fruit; capsule ·1–·15 in. broad; seed slightly curved, ·05 in. long, strongly pitted ..... 2. *suberosa.*

1. NEOPELTANDRA LONGIPES, Gamble. *Phyllanthus longipes*, Muell. Arg.; F. B. I. v. 287. *Peltandra longipes*, Wt. Ic. t. 1891.
   W. Ghâts, hills from Coimbatore to Anamalais and hills of Tinneveily in evergreen forests up to 6,000 ft.
   A slender undershrub with white bark and very thin leaves.
2. NEOPELTANDRA SUBEROSA, Gamble. *Phyllanthus suberosus*, Wt. in Wall. Cat. 7910; F. B. I. v. 287.
   Hills of the N. Circars, in Vizagapatam and Godavari; Deccan, Veligonda Hills of Nellore (Ramaswami); W. Ghâts, Bolampatti Hills of Coimbatore (Fischer), Pulney Hills (Bourne).
   A very slender undershrub with pale bark, the leaves very membranous and variable in size.

9. Phyllanthus, Linn. (modified).

Herbs or shrubs. *Leaves* small, alternate, distichous, the branchlets resembling pinnate leaves; stipules narrow. *Flowers* very small, monoecious, in axillary clusters or solitary, bracteate. *Calyx* lobes 5–6, imbricate. *Petals* 0. *Disk* in ♂ of small glands, in ♀ of glands or annular. *Stamens* 3, more or less free or the filaments combined in a column; anthers oblong or didymous, dehiscing vertically or transversely. *Ovary* 3-celled; styles 3, free or connate at base, 2-fid. *Fruit* a capsule with 3 crustaceous or thin 2-valved cocci. *Seeds* trigonous, rounded at back.

Anthers erect, the cells dehiscing vertically, the filaments united in a column :—

Shrubs ; seeds foveolate :—

Leaf branchlets 2–6 in. long ; leaves oblong, obtuse or apiculate, ·4–·75 in. long, main nerves 6–8 pairs ; styles spreading ; seed-pits conspicuous ..... 1. *polyphyllus.*

Leaf branchlets 1–3 in. long, or little more ; leaves elliptic-oblong, obtuse, apiculate, ·2–·3 in. long, main nerves obscure ; styles short ; seed-pits very minute ..... 2. *Lawii.*

Herbs or small undershrubs :—

Capsules smooth, the seeds with concentric lines of minute tubercles, and minute cross-bars :—

Leaves glabrous, subcoriaceous, obovate or oblanceolate, cuneate, rounded or retuse at apex, mucronate, glaucous, up to 1·25 in. long ; stipules lanceolate, peltate ; ♂ flowers minute, fascicled, ♀ solitary, on filiform pedicels ; anthers subsessile ..... 3. *maderaspatensis.*

Leaves glabrous, membranous, elliptic or ovate, acute, up to 1·25 in. long ; stipules lanceolate, decurrent ; ♂ flowers minute, fascicled, ♀ solitary, on thickened pedicels ; anthers free above 4. *Rheedii.*

Capsules verrucose, the seeds prominently transversely ridged and with faint cross-bars ; leaves glabrous or hispid on the margins, chartaceous, oblong, apiculate, up to ·75 in. long ; stipules subulate ; ♂ flowers very minute, ♀ larger, sessile ; anthers sessile 5. *urinaria.*

Anthers subglobose, the cells dehiscing transversely or on a slant :—

Stipules peltate, subsagittate ; capsule more or less verrucose, seeds minutely tubercled ; disk of ♂ of large flat glands ; filaments free :—

Disk of ♀ saucer-shaped, thin, wavy ; style lobes recurved, flattened on the ovary :—

Leaves elliptic, obtuse, apiculate, the margins thickened, the nerves 4–5 prominent, joining in arches, ·2–·4 in. long, ·1–·2 in. broad ; ♂ flowers subsessile, ♀ pedicelled ; capsule glandular 6. *Narayanswamii.*

Leaves linear-oblong, obtuse or acute at apex, apiculate, the margins thickened, the nerves invisible, ·5–·75 in. long, ·1–·3 in. broad ; ♂ flowers few, minute, subsessile, ♀ more numerous, on filiform pedicels ..... 7. *simplex.*

Leaves of upper branchlets elliptic, obtuse, about ·3 in. long,

of lower stems elliptic-oblong, up to ·75 in. long, ·4 in. broad, the nerves about 5 pairs, faint, glaucous beneath; ♂ flowers many, in fascicles, ♀ few, both on filiform pedicels

8. *Gardneriana.*

Disk of ♀ cushion-shaped, thick; style lobes erect, spreading; leaves elliptic or elliptic-oblong, obtuse, up to 2 in. long, 1 in. broad, the nerves about 7 pairs, glaucous beneath, glabrous or hispid; ♂ flowers fascicled, shortly pedicelled, ♀ long-pedicelled

9. *Macraei.*

Stipules not peltate, lanceolate; seeds with regular lines of very minute tubercles joined by minute cross-bars; filaments connate in a column:—

Leaves coriaceous or fleshy, orbicular or obovate, obtuse or apiculate, scarcely ·25 in. in diam.; disk of ♂ of minute glands, of ♀ cushion-shaped; style-arms recurved with short lobes

10. *rotundifolius.*

Leaves membranous, usually glaucous beneath:—

Leaves usually broadly obtuse at apex, very variable in size but usually under ·5 in. long, elliptic-obovate or -oblong, prominently distichous so that the branchlets resemble pinnate leaves; anthers transversely dehiscing; disk of ♂ of minute glands, of ♀ saucer-shaped with erect lobes; styles recurved

11. *Niruri.*

Leaves usually acute, sometimes rounded, at apex, elliptic or obovate, up to at most ·75 in. long:—

Stipules lanceolate, long-acuminate; flowers rather large, the calyx-lobes with prominent scarious margins; disk of ♂ flowers with star-like glands, of ♀ saucer-shaped, crenulate or lobed; staminal column long, anther-slits transverse; styles erect, shortly bifid ..... 12. *debilis.*

Stipules ovate, acute or acuminate, small; flowers very small, the calyx-lobes with obscure scarious margins; disk of ♂ flowers with peltate glands, of ♀ cushion-like, broadly lobed; staminal column slender, anthers reniform; styles erect with slender lobes ..... 13. *Missionis.*

1. PHYLLANTHUS POLYPHYLLUS, Willd.; F. B. I. v. 290; Wt. Ic. t. 1895, fig. 2.

Deccan, hill forests of Kurnool, Cuddapah, Chittoor and Nellore, Kambakam Hill in Chingleput; Carnatic, Javadi Hills in S. Arcot, S. to hills of Tinnevelly, up to 4,000 ft.; E. slopes of Nilgiris.

A shrub or small tree somewhat resembling *Emblica officinalis* in leaf but quite different in fruit.

2. PHYLLANTHUS LAWII, Grah.; F. B. I. v. 290.
N. Circars, in Godavari and Kistna; Carnatic, hills of Salem; W. Ghâts, Wynaad to Travancore, gregarious on the banks and in the beds of rocky rivers.
A straggling shrub with long purplish branches armed with stipular tubercles bearing small thorns, the flowers pink. Vern. *Mal.* Uri.

3. PHYLLANTHUS MADERASPATENSIS, Linn.; F. B. I. v. 292; Wt. Ic. t. 1895, fig. 3.
N. Circars, Deccan and Carnatic on dry lands, especially black cotton soils and near the sea coast.
An erect or decumbent herb, sometimes nearly an undershrub.

4. PHYLLANTHUS RHEEDII, Wt. Ic. t. 1895, fig. 1 (*poor*); F. B. I. v. 293.
W. Ghâts, most Districts from S. Canara to Nilgiris, Anamalais, and the hills of Tinnevelly above 5,000 ft.
A slender branching erect herb, the calyx-lobes usually white-margined.

5. PHYLLANTHUS URINARIA, Linn.; F. B. I. v. 293. *P. leprocarpus*, Wt. Ic. t. 1895, fig. 4.
All plains Districts, in forest undergrowth and among grasses, up to 3,000 ft.
An annual or perennial erect herb, with more or less sensitive leaflets, which are sometimes pink when young.

6. PHYLLANTHUS NARAYANSWAMII, Gamble in Kew Bull. 1925, 329.
N. Circars, Rampa Hills of Godavari, at 4,500 ft. (V. Narayanswami), perhaps on rocks.
A small wiry undershrub with many branchlets from a stout rootstock.

7. PHYLLANTHUS SIMPLEX, Retz.; F. B. I. v. 295. *Macraea oblongifolia*, Wt. Ic. t. 1902, fig. 1.
N. Circars and Carnatic from the Chilka Lake to Madras; Deccan, in N. Coimbatore, on hot dry soils, up to 3,000 ft. in hilly country.
A stiff almost woody herb with long flattened branches.

8. PHYLLANTHUS GARDNERIANUS, Baill. *P. simplex*, var. *Gardneriana*, F. B. I. v. 295. *Macraea Gardneriana*, Wt. Ic. t. 1902, fig. 3. *M. ovalifolia*, Wt. Ic. t. 1902, fig. 4.

W. Ghâts, in all Districts from S. Canara to Tinnevelly, but especially common in Nilgiris, Anamalais and Pulneys, above 5,000 ft.

A slender undershrub with woody rootstock and long branches, the leaves smaller in size upwards, plants of dry hill tops often dwarfed and with very small leaves.

9. PHYLLANTHUS MACRAEI, Muell. Arg., F. B. I v. 296. *Macraea Rheedii*, Wt. Ic. t. 1901.

W. Ghâts, Sholas of the Pulney Hills at 5,000–7,000 ft. (Bourne, etc.); Agastiamalai Peak, Tinnevelly (Barber),

A shrub, apparently reaching 2–3 ft. in height, with long weak flattened branchlets and capsules prominently warted when wet, leaf margins sometimes ciliate.

Var. *hispidus*. Branchlets and leaves softly hispid, the latter usually cordate at base.

Pulney Hills, on the outer edges of woods (Wight), Levinge's Path, 7,000 ft. (Munch).

10. PHYLLANTHUS ROTUNDIFOLIUS, Klein; F. B. I. v. 299.

N. Circars and Carnatic, sands on the sea-coast.

A prostrate or slightly ascending fleshy herb with stout rootstock and long trailing branches.

11. PHYLLANTHUS NIRURI, Linn.; F. B. I. v. 298; Wt. Ic. t. 1894.

All plains Districts, a weed of gardens and cultivated land.

A branching annual herb reaching 12–18 in. high. It is often used in native medicine. Vern. *Hind.* Jar-amla.

12. PHYLLANTHUS DEBILIS, Herb. Ham.; F. B. I. v. 299.

N. Circars and Carnatic, in shady places in the hill forests, West to the E. slopes of the Ghâts.

An erect slender herb or undershrub with many very slender branchlets.

13. PHYLLANTHUS MISSIONIS, Hook. f.; F. B. I. v. 297.

W. Ghâts, on E. slopes, Coimbatore to Tinnevelly, at low levels.

An erect undershrub with rather distant leaves.

P. speciosus, Jacq., is a shrub with flattened branches, often found in gardens in the plains.

10. Reidia, Wight.

Shrubs or undershrubs, usually with erect stems bearing many spreading branchlets towards the top. *Leaves* alternate, usually membranous; stipules small, often many and persistent. *Flowers* monoecious, axillary, ♂ and ♀ in fasicles, the ♂ with rather short filiform pedicels, the ♀ with longer pedicels widening upwards; bracts very small, often numerous and imbricate. *Calyx*-lobes in ♂ 4, in ♀ 6, persistent and sometimes enlarging in fruit. *Corolla* 0. *Disk* in ♂ of 4 glands alternate with the calyx-lobes, in ♀ of 6 glands combined in a fleshy ring or cup. *Stamens* 2 or 3, the filaments united in a column around a pistillode; anthers dehiscing horizontally. *Ovary* 3-celled, 2 ovules in each cell; styles 3, deeply 2-fid. *Fruit* a capsule of 3 thinly crustaceous 2-valved cocci. *Seeds* triangular, glabrous or appressed hairy; cotyledons oblong.

Calyx-lobes of ♂ dentate or lacerate :—

Calyx-lobes of ♂ narrow, deeply lacerate, of ♀ less cut; ♂ flowers very small on short pedicels rising from a tuft of imbricate bracts, several together in clusters on the lower part of the branchlets, ♀ flowers larger, at the ends of the branchlets; leaves ovate-lanceolate, acute, unequal at base, up to 2 in. long, glaucous beneath ..... 1. *Gageana.*

Calyx-lobes of ♂ suborbicular, lacerate, of ♀ less so; flowers few, in axillary clusters, but usually ♂ in lower, ♀ in upper axils; disk of ♀ cup-shaped; leaves ovate, acute, somewhat unequal at base, reticulate, up to 3 in. long, 1·25 in. broad ..... 2. *fimbriata.*

Calyx-lobes of ♂ orbicular-ovate, dentate, of ♀ slightly toothed; flowers few, ♂ in lower axils, ♀ near the ends of the branches; disk of ♀ cushion-shaped; fruit large, about 1 in. in diam.; leaves ovate-lanceolate, acuminate, unequal-sided, glaucous beneath, up to 2·5 in. long, 1·5 in. broad ..... 3. *megacarpa.*

Calyx-lobes of ♂ not dentate or lacerate :—

Leaves large, at least 1 in. long; flowers usually fascicled :—

Calyx-lobes of ♀ greatly enlarged in fruit and closely imbricate; disk in ♂ annular, in ♀ saucer-shaped; leaves elliptic or elliptic-oblong, acute or obtuse, rounded at base, equal-sided, up to 2·5 in. long, 1 in. broad ..... 4. *macrocalyx.*

Calyx-lobes of ♀ larger than those of ♂ but less enlarged in fruit.

Flowers of both ♂ and ♀ axillary to the leaves, the ♀ rather large; calyx-lobes ovate, glandular-striate, disk in ♂ broadly

4-lobed, in ♀ flat: leaves ovate, acute, obtuse at base, glaucous beneath, up to 2 in. long, 1·25 in. broad .....5. *Beddomei.*

Flowers in leaf-axils and also on long terminal leafless branchlets with linear bracts and stipules; calyx-lobes orbicular, disk tuberculed; leaves triangular-ovate, acuminate, rounded at base, nearly equal-sided, reticulately nerved, up to 2 in. long, 1 in. broad.....6. *Bailloniana.*

Leaves small, under 1 in. long; branchlets prominently rough with many stipules; flowers solitary:—

Capsule glabrous; calyx-lobes of ♂ ovate, of ♀ oblong, reflexed after flowering: disk-lobes of ♂ small and distinct, of ♀ a small ring; leaves obliquely unequally obovate, acute at base, glaucous beneath, up to ·75 in. long .....7. *longifloxa.*

Capsule densely covered with soft branched hairs:—

Calyx-lobes ovate acuminate ciliate; disk-glands truncate, dotted; leaves obliquely ovate-oblong, apiculate, pale beneath, softly villous, up to 1 in. long, ·5 in. broad .....8. *floribunda.*

Calyx-lobes broadly ovate, short, glabrous, with few pellucid dots; disk-glands truncate, dotted; leaves obliquely ovate-falcate, long-apiculate, pale beneath, up to ·4 in. long, ·2 in. broad .....9. *stipulacea.*

1. REIDIA GAGEANA, Gamble in Kew Bull. 1925, 331.

W. Ghâts, hills of Travancore and Tinnevelly, in evergreen forest at about 2,000 ft. (Lawson, Beddome).

An undershrub, remarkable for the densely clustered ♂ flower with much lacerate calyx-lobes in ♂, less so in ♀, the ends of the branchlets leafless, but many-stipular.

2. REIDIA FIMBRIATA, Wt. Ic. t. 1904, fig. 1. *Phyllanthus fimbriatus*, Muell. Arg.; F. B. I. v. 302.

W. Ghâts, Sispara Ghât in Nilgiris, at 4,000 ft. (Beddome, Gamble).

A glabrous shrub, the capsule nearly ·25 in. in diam.

3. REIDIA MEGACARPA, Gamble in Kew Bull. 1925, 332.

W. Ghâts, Devala in S.E. Wynaad at 3,000 ft. (Gamble).

A glabrous undershrub with large pale-coloured capsule, soon splitting, the seeds appressed-hairy.

4. REIDIA MACROCALYX, Gamble, n. comb. *Phyllanthus macrocalyx*, Muell. Arg.; F. B. I. v. 301. *R. latifolia*, Wt. Ic. t. 1904, fig. 2?

Bababudan Hills, Mysore (Law.); Sivagiri Hills, Tinnevelly (Wight).

A much-branched undershrub.

5. REIDIA BEDDOMEI, Gamble in Kew Bull. 1925, 331.

Chokampatti Hills of Tinnevelly, at 5,000 ft. (Beddome). hills of Travancore (Bourdillon).

A glabrous undershrub.

6. REIDIA BAILLONIANA, Gamble, n. comb. *Phyllanthus Baillonianus*, Muell. Arg.; F. B. I. v. 300.

W. Ghâts, hills of Tinnevelly.

A shrub reaching 3–4 ft. in height, the leaves often marbled with white and purple, the fruit ·25 in. long.

7. REIDIA LONGIFLORA, Gamble, n. comb. *Phyllanthus longiflorus*, Heyne; F. B. I. v. 302. *R. ovalifolia*, Wt. Ic. t. 1904, fig. 3 (*not good*).

W. Ghâts, hills of Travancore and Tinnevelly about 2,000 ft.

A small bush about 2 ft. high with pretty pink flowers (Bourdillon).

8. REIDIA FLORIBUNDA, Wt. Ic. t. 1903. *Phyllanthus Wightianus*, Muell. Arg.; F. B. I. v. 303.

Carnatic, Melpat in S. Arcot, Shevaroy Hills, Kollimalai Hills; W. Ghâts on E. side of Nilgiris and Pulneys, at about 2,000–4,000 ft.

A branching shrub, the branchlets rough with scars and stipules, the flowers red, the leaves with a pink tinge.

9. REIDIA STIPULACEA, Gamble in Kew Bull. 1925, 332.

W. Ghâts, Anamalai and Pulney Hills, in thick undergrowth.

A straggling shrub with very rough branchlets having long and persistent brown stipules.

11. Prosorus, Dalz.

Trees. *Leaves* alternate, thin, deciduous. *Flowers* dioecious, small, ♂ numerous, in axillary fascicles with capillary pedicels. ♀ solitary or few together, axillary, pedicels long and stouter. *Calyx*-lobes 4 in both sexes. *Disk* annular, fleshy. *Stamens* 4, with free filaments, anthers oblong, extrorse, the cells dehiscing longitudinally. *Ovary* 3-celled: ovules 2 in each cell: styles

short, bifid, the branches recurved. *Fruit* a globose capsule with thin epicarp, 6-seeded. *Seeds* irregularly trigonous, arillate, blue; albumen coarse; cotyledons small, flat.

PROSORUS INDICUS, Dalz. *Phyllanthus indicus*, Muell. Arg.; F. B. I. v. 305.

W. Ghâts, Anamalai Hills (Beddome), hills of Tinnevelly (Wight), Coorg and Wynaad (*fide* Beddome).

A small deciduous tree with membranous distichous elliptic or ovate acute leaves up to 6 in. long, 3 in. broad.

12. Kirganelia, Baill.

Shrubs, usually climbing or straggling. *Leaves* alternate, small or moderate-sized, distichous, thin; stipules lanceolate. *Flowers* monoecious, ♂ and ♀ mixed, in axillary clusters, sometimes in pairs or solitary, the clusters sometimes appearing racemose from the absence of leaves; pedicels filiform. *Calyx*-lobes 5, imbricate, the 3 inner often the larger. *Petals* 0. *Disk* in ♂ or ♀ of 5 fleshy glands. *Stamens* 5, in 2 series, the outer with free filaments, the inner 2 or 3 with the filaments connate in a column; anthers dehiscing longitudinally. *Ovary* 5–12-celled; ovules 2 superposed in each cell; stigmas as many or half as many as the cells, minute, sessile, 2-lobed. *Fruit* a fleshy 5–12-celled berry, the seeds superposed. *Seeds* trigonous; testa crustaceous, albumen fleshy; cotyledons flat, truncate.

KIRGANELIA RETICULATA, Baill. *Phyllanthus reticulatus*, Poir.; F. B. I. v. 288. *Anisonema multiflorum*, Wt. Ic. t. 1899.

All plains Districts, especially in hedges or waste places near villages and in thickets along streams.

A straggling shrub with slender branches, small elliptic or ovate or orbicular or spathulate thin leaves and a purple fleshy berry about ·2 in. in diam. Bark brown, thin; wood reddish-white, hard. Vern. *Hind.* Panjuli; *Tel.* Nella purududu, Phulsar; *Tam.* Pula, Pullanti.

13. Emblica, Gaertn

Trees, branchlets distichous. *Leaves* small, pinnately arranged on the branchlets; stipules minute, scarious. *Flowers* very

small, monoecious, in axillary fascicles, ♂ and ♀ mixed or frequently ♀ in lower and ♂ in upper axils of present or fallen leaves. *Calyx*-lobes 5–6, oblong. *Petals* 0. *Disk* in ♂ 0 or of minute glands alternate with the calyx-lobes, in ♀ cupular, the margin lacerate. *Stamens* 3, the filaments connate in a column, the anthers cohering by the connectives, which end in an apiculus, cells distinct dehiscing longitudinally. *Ovary* 3-celled; ovules 2 in each cell; styles connate at base with broad recurved twice-branched arms. *Fruit* depressed-globose, fleshy, with 3 bony 2-valved cocci. *Seeds* 6, trigonous; albumen fleshy; cotyledons flat, broad, cordate or truncate.

Leaves on the branchlets very many, 100 or more sometimes, linear oblong, apiculate, ·3–·75 in. long, about ·1 in. broad; glands in ♂ very small; style-arms in ♀ thick and twice bifid, sometimes broad, spreading ..... 1. *officinalis.*
Leaves on the branchlets many, up to about 50, elliptic-oblong, rounded or retuse at apex, ·5–·9 in. long, ·2–·3 in. broad; glands in ♂ larger; style-arms in ♀ slender, usually twice bifid, recurved
2. *Fischeri.*

1. EMBLICA OFFICINALIS, Gaertn; Wt. Ic. t. 1896. *Phyllanthus emblica*, Linn.; F. B. I. v. 288; Bedd. Fl. t. 258; Brand. For. Fl. t. 52.
N. Circars, Deccan and Carnatic, in dry deciduous forests and up to 4,000 ft. as on Mahendragiri; also in W. Ghâts, occasional on dry slopes. Emblic Myrabolam.
A small or moderate-sized deciduous tree, the branchlets and rhachises villous. Bark light grey, exfoliating; wood red, hard and close-grained, useful for poles, implements and furniture, and good under water. The fleshy fruits are ·5–1 in. in diam., and are used for tanning and sometimes eaten. Vern. *Hind.* Aonla; *Ur.* Oura, ounla; *Tel.* Usiriki; *Tam.* Nelli.
2. EMBLICA FISCHERI, Gamble in Kew Bull.
Carnatic, Kambakam Hills of Chingleput, Veligonda Hills of Nellore (M. Ramaswami); Deccan, hills of N. Coimbatore (Fischer); W. Ghâts, Anamalai Hills to 3,000 ft. (Barber).
A small tree with rather large leaves, the branches pale brown, rough, the fruit not known.

14. Fluggea, Willd.

Shrubs, unarmed or thorny, branchlets angular. *Leaves* alternate, entire, distichous. *Flowers* dioecious, minute, pedicelled, axillary, ♂ in clusters, ♀ subsolitary. *Calyx*-lobes 5, imbricate, subpetaloid. *Petals* 0. *Disk* in ♂ of 5 or less glands alternate with the stamens; in ♀ annular flat, toothed. *Stamens* 5, rarely less, the filaments free, exserted; anthers erect, the cells dehiscing longitudinally. *Ovary* 1-3-celled; styles free, recurved, usually 2-fid; pistillode in ♂ erect 2-3-fid. *Fruit* globose, coriaceous or outside fleshy, separating into distinct 2-valved cocci. *Seeds* triquetrous; testa crustaceous; albumen scanty; embryo curved, the cotyledons flat.

Unarmed; leaves 1-3 in. long, 1·5 in. broad, elliptic or obovate, rounded at apex; main nerves 5-7 pairs; fruits usually dry and very small, but some larger and with a fleshy pericarp ..... 1. *virosa.*
Branchlets ending in spines; leaves ·5–1 in. long, rarely more, obovate or orbicular, sometimes emarginate, glaucous, reticulate; fruit dry, globose, white, ·25 in. in diam. ..... 2. *Leucopyrus.*

1. Fluggea virosa, Baill. *F. microcarpa*, Bl.; F. B. I. v. 328.
   All dry Districts, in deciduous forest and second-growth areas, in the hills to 4,000 ft.
   A small tree or large shrub, the leaves very variable in size and shape. Bark smooth, thin, reddish-brown; wood red, hard, close-grained, useful for agricultural tools. Vern. *Hind.* Dalme.
2. Fluggea Leucopyrus, Willd.; F. B. I. v. 328; Wt. Ic. t. 1875.
   All dry Districts, in open places, especially near the coast, rising in the hills to 3,000 ft.
   A large stiff straggling shrub, the ends of the branchlets sharply spinous, the fruits white. Wood hard and close-grained. Vern. *Hind.* Hartho; *Tel.* Tella purugudu; *Tam.* Madpulanti.

15. Antidesma, Linn.

Small trees or shrubs. *Leaves* alternate, entire; stipules narrow. *Flowers* dioecious, very small, in slender, axillary or terminal, simple or branched spikes or racemes. *Calyx*-lobes 3–5, rarely more. *Petals* 0. *Stamens* 2–5, inserted on or within

the disk; filaments exsert; connective broad, lunate, the anther-cells ending its wings, dehiscence transverse. *Disk* annular or cushion-like. *Ovary* 1-celled; ovules 2 in each cell; stigmas 2–4, usually short; pistillode in ♂ clavate or globose or 0. *Fruit* a small more or less compressed drupe, crowned by the lateral or terminal stigmas. *Seed* small; albumen fleshy; cotyledons broad, flat.

Stamens inserted in hollows of the disk :—

Stamens 3–5, usually 3 :—

Spikes of ♂ flowers slender, of ♀ short, the clusters close; leaves coriaceous, shining, ovate, obtusely acuminate, mucronate, up to 5 in. long, 2 in. broad, but often much smaller, main nerves about 10 pairs joined in arches and reticulate .....1. *zeylanicum.*

Racemes of ♂ flowers long, of ♀ long, the clusters distant; leaves chartaceous shining above, elliptic-oblong, acuminate, mucronate, up to 9 in. long, 3 in. broad, main nerves 7–8 pairs, oblique, prominent, looped and with transverse nervules .....2. *Menasu.*

Stamens 2; flowers in slender racemes; leaves thin, dull, elliptic or obovate, acute, up to 4 in. long, 2 in. broad, main nerves 5–8 pairs, faint .....3. *diandrum.*

Stamens inserted within the disk :—

Disk of 5 free lobes, pubescent; stamens 4–7; flowers in villous panicled spikes; leaves orbicular obovate or oblong, obtuse or emarginate, up to 3 in. in diam., softly fulvous-tomentose, main nerves 5–7 pairs.....4. *Ghaesembilla.*

Disk lobed, surrounding the 3–5 stamens and a central truncate pistillode; ♂ flowers in rather thick glabrous spikes, the ♀ racemed; leaves elliptic oblong or obovate, acute or acuminate, usually shining, up to 7 in. long, 2·5 in. broad, main nerves about 8 pairs, curved and looped .....5. *Bunius.*

1. ANTIDESMA ZEYLANICUM, Lamk. *A. Alexiteria*, Linn. *in part*; F. B. I. v. 359.

Carnatic, Kambakam Hill in Chingleput, at 2,000 ft. (Fischer); W. Ghâts, W. Nilgiris to the hills of Travancore and Tinnevelly, in evergreen forests.

A small tree reaching 25 ft. high, the small drupe red.

2. ANTIDESMA MENASU, Miq.; F. B. I. v. 364.

W. Ghâts, in all Districts, in evergreen forests up to 6,000 ft.: hills of N. Coimbatore; Shevaroy Hills of Salem.

A small branching tree with a red edible drupe. Wood darkish-red (Bourdillon). Vern. *Mal.* Puthara vál.

3. ANTIDESMA DIANDRUM, Roth; F. B. I. v. 361. *A. lanceolarium*, Wall.; Wt. Ic. t. 766 (not typical). *Stilago diandra* Roxb. Cor. Pl. t. 166.

N. Circars, Deccan and Carnatic in deciduous forests at low levels, to South Travancore; W. Ghâts, on lower eastern slopes, scarce in Malabar.

A small deciduous tree with thin leaves pleasantly acid and purplish-red edible fruits. Bark smooth, grey; wood pinkish-grey, hard and close-grained. Vern. *Hind.* Amári *Ur.* Nuniári; *Tel.* Pellagumudu.

4. ANTIDESMA GHAESEMBILLA, Gaertn.; F. B. I. v. 357. *A. paniculatum*, Roxb.; Wt. Ic. t. 820. *A. pubescens*, Roxb. Cor Pl. t. 167; Wt. Ic. t. 821.

N. Circars, Deccan and Carnatic, in deciduous forests at low elevations; W. Coast. in Travancore and Malabar.

A small deciduous tree with a red-purple edible small drupe. Bark grey or pale brown: wood red, the heartwood darker. Vern. *Hind.* Umtoa; *Ur.* Nuniári; *Tel.* Polari pulsur, Kathupulitsi.

5. ANTIDESMA BUNIUS, Spr.; F. B. I. v. 358; Wt. Ic. t. 819.

N. Circars, hills of Vizagapatam, at 4,500 ft. (A. W. Lushington); W. Ghâts, Pulney Hills and hills of Tinnevelly.

A small evergreen tree with reddish drupe.

16. Hemicyclia, W. & A.

Trees or shrubs. *Leaves* evergreen, alternate, entire or slightly toothed, usually unequal at base. *Flowers* dioecious, ♂ in clusters in the axils of the leaves or on the branchlets below them, ♀ usually solitary, pedicels in ♀ longer than in ♂, often lengthened in fruit. *Calyx*-lobes usually 4, sometimes 5, imbricate, the inner usually the larger. *Petals* 0. *Stamens* 4–24, inserted round the disk, filaments free: anthers erect, the cells parallel. *Disk* flat or saucer-shaped, often crenate on the margins. *Ovary* obliquely ovoid, 1-, rarely 2-celled; ovules 2 in each cell; stigma 1, sessile or on a short style, broadly reniform or semi-orbicular, flat or recurved. *Fruit* a globose, obovoid or ellipsoid drupe with hard

endocarp. *Seed* usually solitary, arillate; albumen fleshy, embryo straight; cotyledons broad, flat.

Stamens 6–12 :—

Leaves obtuse, very coriaceous, glabrous, elliptic, rounded or cordate at base, entire or sometimes repand-toothed, nerves very obscure, up to 3 in. long, 2 in. broad; calyx-lobes small, ciliate; stigma orbicular, peltate, crenulate; fruit ·3 in. in diam., globose, red .....1. *sepiaria.*

Leaves acute or acuminate, coriaceous :—

Leaves entire, nerves prominent and reticulate: calyx-lobes densely fulvous-tomentose; stigma mushroom-shaped :—

Pedicels slender, of ♂ up to ·5 in., of ♀ longer, in fruit 1-2 in.: leaves glabrous, elliptic or lanceolate, abruptly and obtusely acuminate at apex, slightly unequal at base, main nerves 10-12 pairs, up to 5 in. long, 2·5 in. broad; clusters about 5-6 flowers; fruit obovoid, ·75-1 in. long.....2. *elata.*

Pedicels short, about ·25 in., tawny-villous; clusters about 3–4 flowers :—

Leaves elliptic-oblong, obtusely acute, unequal at base, up to 6 in. long, nearly 2 in. broad, main nerves about 10-15 pairs .....3. *venusta.*

Leaves lanceolate, obtusely acuminate, the point often twisted, the base slightly unequal, up to 3·5 in. long, 1·5 in. broad, main nerves about 8 pairs with fine reticulation: fruit obovoid or ellipsoid, ·7 in. long, its pedicel ·5 in....4. *Wightii.*

Leaves crenate-serrate, glabrous, ovate-lanceolate, acuminate, slightly unequal at base, up to 3 in. long, 1·5 in. broad, main nerves 8-10 pairs, obscure; clusters up to 8 flowers, the pedicels slender, villous; calyx-lobes thin, ciliate; fruit ovoid, red, glabrous, ·5 in. long .....5. *travancorica.*

Stamens about 24; leaves entire, ovate, obtusely and often retusely acuminate, unequal at base, minutely reticulate beneath, up to 2·5 in. long, 1·25 in. broad, main nerves 5–6; clusters about 4–6 flowers, the pedicels ·25 in. long; calyx-lobes fulvous-pubescent

6. *Porteri.*

1. HEMICYCLIA SEPIARIA, W. & A., F. B. I. v. 337; Wt. Ic. t. 1872 ♂.

N. Circars, Deccan and Carnatic, in dry evergreen and semi-evergreen forests, eastwards to the drier slopes of the Ghâts.

A small evergreen tree or branching shrub. Bark grey, thin, smooth; wood white with a greyish-brown heartwood, very hard and close-grained, like boxwood, but apparently little used except for fuel. Vern. *Tel.* **Bira**; *Tam.* **Virai**; *Kan.* Hiru.

2. HEMICYCLIA ELATA; Bedd. Fl. t. 279; F. B. I. v. 339.

W. Ghâts, forests of the Wynaad at 2,000-4,000 ft.; Anamalais and hills of Travancore and Tinnevelly.

A lofty straight glabrous tree reaching 90–100 ft. in height (Bedd.), with shining leaves, the reticulated secondary nerves not very prominent. The wood is said to be strong and suitable for building. Bourdillon likens it to box.

3. HEMICYCLIA VENUSTA, Thw.; F. B. I. v. 339. *Astylis venusta*, Wt. Ic. t. 1992.

W. Ghâts, W. slopes of Nilgiris in Ochterlony Valley (Wight) and on Sispara Ghât (Beddome) about 3,000–5,000 ft.

A shrub or small tree with many often drooping branches. the reticulated nervation irregular but not very prominent.

4. HEMICYCLIA WIGHTII, Hook. f.; F. B. I. v. 339.

W. Ghâts, Anamalai and Ayamalai Hills and hills of Travancore at 3,000-5,000 ft., in evergreen forests.

A small or moderate-sized tree reaching 40 ft. in height. Stem fluted; bark white, smooth, thin; wood pale grey, hard and close-grained, but liable to split, used for posts. Vern. *Tam.* Vellelambu; *Mal.* Vella Kasavu.

5. HEMICYCLIA TRAVANCORICA, Bourd. Trav. Trees, 329.

W. Ghâts, evergreen forests of S. Travancore near Ariyankavu at 1,000 ft. (Bourdillon) in evergreen forests.

A medium-sized graceful tree. Bark pale brown, smooth; wood greyish-white, hard and close-grained. Vern. *Tam.* Vellei pillai.

6. HEMICYCLIA PORTERI, Gamble in Hook. Ic. t. 2701.

Carnatic, Warsanad Valley, Madura, near streams at 2,000 ft. (Porter). Cegilwood.

A small evergreen tree, the flowers larger. Bark grey, thin, peeling off in flakes; wood yellowish-white, hard and close-grained, used in building.

17. Cyclostemon, Blume.

Trees. *Leaves* alternate, entire or toothed, base often unequal-sided. *Flowers* dioecious, in axillary or lateral clusters, the lateral ones often on tubercles on old wood. *Sepals* 4–6, imbricate, the buds globose. *Petals* 0. *Stamens* few or many, inserted round a rather broad disk; anthers with parallel cells. *Disk* annular or saucer-shaped, sometimes with reflexed marginal lobes, often ribbed. Ovary 2–4-celled; ovules 2 in each cell; style short or elongate; stigmas dilated, spreading or connate and peltate. *Fruit* a subglobose ovoid or oblong indehiscent drupe, the pericarp crustaceous, endocarp granular; cocci 2–4, usually 2. *Seed* usually solitary in the cells; testa thin; albumen thick, fleshy; cotyledons broad and flat.

Flowers axillary; disk glabrous with 7–10 stamens round it; ♂ flowers in clusters, ♀ solitary, the ovary fulvous-tomentose; leaves subcoriaceous, elliptic or elliptic-oblong, obtuse or obtusely acute, up to 6 in. long, 2·5 in. broad, main nerves 12–15 pairs, reticulate between ....1. *assamicus.*

Flowers sometimes axillary, but usually in clusters on old wood:—

Disk small, fulvous-villous; stamens many:—

Flowers sessile or very nearly so, calyx fulvous-villous; drupe about 1 in. in diam.; leaves and branchlets glabrous; leaves coriaceous, oblong, abruptly acuminate at apex, entire or distantly serrate, up to 9 in. long, 3 in. broad, main nerves about 10 pairs joined by prominent reticulation.....2. *macrophyllus.*

Flowers pedicelled, the pedicels ·25 in. long; leaves on nerves beneath and branchlets fulvous-villous; calyx tomentose; leaves subcoriaceous oblong, abruptly obtusely acuminate at apex, entire or distantly serrate, up to 9 in. long, 3 in. broad, main nerves about 9 pairs joined by not prominent reticulation

3. *malaccensis.*

Disk large, glabrous, radiately ribbed and with inflexed marginal lobes; ♂ flowers pedicelled, ♀ nearly sessile; calyx glabrous except the ciliate margins; drupe 1·5–2 in. in diam.; leaves coriaceous, glabrous, oblong or elliptic-oblong, abruptly obtusely acuminate, entire or distantly serrate, up to 8 in. long, 3 in. broad, main nerves 8–10 pairs, reticulation prominent .....4. *confertiflorus.*

1. CYCLOSTEMON ASSAMICUS, Hook. f.; F. B. I. v. 342.

N. Circars. Mahendragiri Hill in Ganjam at 4,500 ft. and

Palkonda Hills in Vizagapatam, at 2,000 ft. (Gamble), in moist places.

A small branching evergreen tree with shining leaves and scarlet fruit ·5–·75 in. long.

2. CYCLOSTEMON MACROPHYLLUS, Bl.; F. B. I. v. 340; Bedd. Fl. t. 278.

W. Ghâts, Coorg and Wynaad to the Anamalais and hills of Tinnevelly and Travancore, at 2,000–4,000 ft., in evergreen forests.

A large evergreen tree with fluted stem and rough yellow fleshy fruit 1 in. in diam. Bark grey; wood yellowish-brown, hard. Vern. *Mal.* Mala payin.

3. CYCLOSTEMON MALABARICUS, Bedd.; F. B. I. v. 341; Bedd. Ic. t. 183.

W. Ghâts, hills of Tinnevelly and Travancore, at 3,000–5,000 ft., in evergreen forests, at higher elevations than the last.

A medium-sized tree with very oblong leaves and a tomentose fruit 1 in. in diam.

4. CYCLOSTEMON CONFERTIFLORUS, Hook. f.; F. B. I. v. 341.

W. Ghâts, Chenat Nair Forest, Malabar (Lobo), northwards to Kanara, southwards to Travancore (Bourdillon), in evergreen forest.

A large tree with a large yellow fruit, the stigmas of the ♀ 2, large and semicircular.

18. Sauropus, Blume.

Shrubs or undershrubs. *Leaves* alternate, distichous, membranous, entire; stipules minute. *Flowers* monoecious, minute, axillary, pedicelled, clustered or solitary. *Calyx* 6-lobed, ♂ disciform, urceolate or turbinate, the bases of the lobes with thickened folds sometimes reflexed; ♀ larger and accrescent. *Petals* 0. *Disk* 0. *Stamens* 3, the filaments combined in a trigonous column, the anthers seated on the angles, the cells linear. *Ovary* ovoid or globose, 3-celled, rounded or concave at the apex; ovules 2 in each cell; styles 3, on the angles of the top of the ovary, the arms curved. *Fruit* a globose or depressed fleshy or coriaceous capsule, 6-valved or rupturing irregularly, with 6 trigonous crustaceous cocci. *Seeds* with fleshy albumen; cotyledons broad, flat.

Apex of the ovary with 3 style-bearing produced angles: leaves triangular lanceolate from a broad base, up to 5 in. long, 2 in. broad, glaucous beneath, with 6–7 main nerves: fruit white, ·5–·75 in. in diam. ..... 1. *androgynus.*

Apex of the ovary broad, the margin crenulate, the style-bearing angles widely separate:—

Calyx-lobes narrowly triangular, acute, the folds reflexed: leaves elliptic or suborbicular, about ·5–1 in. in diam., glabrous: fruit globose, ·3 in. in diam. ..... 2. *quadrangularis.*

Calyx-lobes cuneate, retusely 2-lobed, the folds narrow; leaves elliptic or orbicular, acute or obtuse, ·5–·75 in. in diam., hispid-pubescent; fruit depressed-globose, ·25 in. in diam... 3. *pubescens.*

1. SAUROPUS ANDROGYNUS, Merr. *S. albicans*, Bl.; F. B. I. v. 332. *S. indicus*, Wt. Ic. t. 1952, fig. 2.

   W. Ghâts, from the Wynaad southwards, in evergreen forest, at 2,000–4,000 ft.

   An erect shrub reaching 4 ft. in height.

2. SAUROPUS QUADRANGULARIS. Muell. Arg.; F. B. I. v. 335. *Ceratogynum rhamnoides*, Wt. Ic. t. 1900 (*not good*).

   N. Circars, in Vizagapatam and Godavari, on cultivated land (Roxb.), also in the hills; W. Ghâts, in most Districts at low levels.

   A small shrub, with many twiggy branchlets.

3. SAUROPUS PUBESCENS, Hook. f.; F. B. I. v. 335.

   Hills of Vizagapatam, up to 4,000 ft. (A. W. Lushington, Barber).

   A small shrub, similar to the last but pubescent. The branches are sometimes compressed and winged.

19. Breynia, Forst.

Shrubs or small trees. *Leaves* small, alternate, entire, petioled, often distichous. *Flowers* monoecious, minute, axillary. *Calyx* in ♂ turbinate or hemispheric, truncate, lobes 5–6, with the rounded glands of the tube behind them; in ♀ campanulate or rotate, 6-lobed, sometimes accrescent in fruit. *Petals* 0. *Disk* 0. *Stamens* 3, the filaments connate in a column, the cells linear parallel, distinct. *Ovary* globose or truncate or depressed at top, 3-celled; either styles 3 sessile or connate in a short column, or stigmas 3 sunk in the apex of the ovary. *Fruit* globose or

depressed, more or less succulent, indehiscent or with a 6-valved pericarp enclosing cocci. *Seeds* with membranous testa: albumen fleshy; cotyledons broad; radicle long.

Calyx of ♀ enlarged in fruit, the fruit itself depressed-globose, orange, dehiscent, ·5–·75 in. in diam.; styles slender, bifid; leaves membranous, broadly elliptic, obtuse, ·5–1 in. long ..... 1. *patens.*
Calyx of ♀ very little enlarged in fruit, the fruit globose, red, ·25–·5 in. in diam.; styles very short; leaves membranous, elliptic or ovate, obtuse or acute, up to 2 in. long, nearly 1 in. broad, but usually much smaller ..... 2. *rhamnoides.*

1. BREYNIA PATENS, Rolfe; F. B. I. v. 329. *Melanthesa turbinata*, Wt. Ic. t. 1897. *M. obliqua*, Wt. Ic. t. 1898, fig. 2.

   Carnatic, hills of Chingleput, S. Arcot and Trichinopoly; W. Ghâts, in dry forest localities at low levels up to 4,000 ft.

   A shrub reaching about 4 ft. high.

2. BREYNIA RHAMNOIDES, Muell. Arg.; F. B. I. v. 330. *Melanthesa rhamnoides*, Wt. Ic. t. 1898, fig. 1.

   N. Circars, Deccan and Carnatic, in deciduous forests, chiefly in open places; W. Ghâts, Malabar and Travancore, less common.

   A large shrub reaching 10 ft. in height, 20 ft. (Bourdillon). Vern. *Tel.* Yellari; *Tam.* Manipulnati.

20. Glochidion, Forst.

Evergreen trees or shrubs. *Leaves* alternate, bifarious, entire, shortly petioled. *Flowers* small, monoecious or dioecious, in axillary clusters. *Calyx* in ♂ of 6 lobes, in 2 series, imbricate, spreading; in ♀ shortly tubular with 6 often unequal lobes. *Petals* 0. *Disk* 0. *Stamens* 3–8, connate by their connectives in a column, the connectives produced in usually free tips; anthers with linear cells, extrorse. *Ovary* 3–15-celled; ovules 2 in each cell; styles connate in a column lobed at the tip, the column sometimes short but usually gradually lengthening; pistillode in ♂ usually 0 or very small behind the anthers. *Fruit* a capsule of 3 or more 2-valved cocci, globose or orbicular or depressed or intruded at the base and apex crowned by the often enlarged

style; the cocci crustaceous or coriaceous, the epicarp separable or not. *Seeds* hemispheric or laterally compressed; testa crustaceous; albumen fleshy; cotyledons flat.

Anthers 4 or more :—

Style a broad shallow cone hollowed at the apex, pubescent at base without; leaves coriaceous, orbicular, obtuse, 2–3 in. in diam. 1. *littorale.*

Style conical, cleft at the tip; flowers in shortly peduncled umbels or fascicles; fruit globose, sometimes beaked; stipules falcate, acuminate :—

Leaves beneath and branches and inflorescence finely grey-pubescent; leaves elliptic- or ovate-oblong, shortly acute at apex, unequal and often subcordate at base, up to 6 in. long, 3 in. broad, main nerves 6–8 pairs; style pubescent; capsules ·2–·3 in. long, conical, beaked ..... 2. *tomentosum.*

Leaves and branches and inflorescence glabrous; leaves ovate lanceolate or oblong, shortly acute at apex, unequal and rounded or cordate at base, up to 8 in. long, 3 in. broad, main nerves 8–12 pairs; style glabrous; capsules ·3–·4 in. long, often beaked, later depressed ..... 3. *zeylanicum.*

Anthers 3 :—

Branchlets, inflorescence and leaves more or less pubescent :—

All parts prominently velvety pubescent; leaves elliptic ovate or lanceolate, obtuse or subacute, 2–5 in. long, 1–2 in. broad (larger in shoots), main nerves 6–8 pairs; stamen connective acute at apex; style cylindric, villous, 4–6-lobed; capsules ·3–·5 in. in diam., depressed, the seeds red ..... 4. *velutinum.*

Branchlets, inflorescence and leaf midribs tawny, crispate pubescent; leaves subcoriaceous, ovate, obtusely acuminate at apex, narrowed at base, with 5–6 very oblique prominent nerves, up to 4 in. long, 1·5 in. broad; style columnar, elongate; capsule 6-lobed, depressed at apex, crowned by the style-column 5. *arboreum.*

Branchlets and inflorescence softly fulvous-tomentose, the leaves beneath sparsely pubescent; leaves oblong, obtuse or obtusely acuminate, 4–5 in. long, 1·25 in. broad, main nerves 6–8 pairs, arched; style short, depressed globose; capsule 6-lobed, smooth, ·25 in. diam. ..... 6. *Johnstonei.*

Branchlets slender, fulvous-puberulous; leaves chartaceous, ovate or ovate-oblong, acuminate at apex, narrowed or obtuse and equal at base, glabrous, main nerves 6–8 pairs, up to 6·5 in.

long, 2 in. broad; style thick, elongate and widening upwards with triangular lobes .....7. *sisparense.*

Branchlets slender, sparsely puberulous; leaves chartaceous, lanceolate, acuminate, unequal at base, glabrous, reticulate; main nerves 8–10 pairs, up to 5 in. long, 1·5 in. broad; style thick, widening upwards; capsule glabrous, ·5 in. broad, tipped by the slender columnar style .....8. *pauciflorum.*

Branchlets and leaves glabrous, sometimes the flowers only very slightly puberulous:—

Leaves chartaceous, elliptic or oblong, obtuse or acute, the base unequal, reticulate, main nerves 6–8 pairs, up to 4 in. long, 1–1·25 in. broad; style very stout, short, truncate; capsule ·4 in. broad, tipped with the short thick style ..9. *neilgherrense.*

Leaves submembranous, ovate, ovate-lanceolate or ovate-oblong, obtuse or shortly acuminate, reticulate, main nerves 6–8 pairs, up to 4 in. long, 1·5 in. broad; style very short, widening at the lobes; capsule ·4 in. broad, tipped with the short thick style 10. *fagifolium.*

Leaves lanceolate or oblong-lanceolate, acuminate at both ends, rather unequal at base, up to 5 in. long, 1·5 in. broad; style conical.....11. *ellipticum.*

Leaves chartaceous, elliptic or elliptic-oblong, abruptly acuminate at apex, acute or obtuse at base, main nerves 7–10, prominent, up to 5 in. long, 2 in. broad; style very small, conical; capsule ·3 in. in diam., depressed ..12. *malabaricum.*

Leaves ovate or obovate, shortly acute at apex, unequal at base, main nerves 5–6 pairs, reticulation prominent, up to 4 in. long, 1·5 in. broad; style columnar eventually .....13. *Bourdillonii.*

1. GLOCHIDION LITTORALE, Blume; F. B. I. v. 308.
   W. Coast, Malabar (Beddome, Wight).
   A small tree.
2. GLOCHIDION TOMENTOSUM, Dalz.; F. B. I. v. 309.
   W. Ghâts in S. Canara, Coorg, Mysore, more scarce in Malabar and Travancore, up to 4,000 ft., in grass land.
   A small tree with rather large leaves and somewhat angular branchlets, the stipules generally erect.
3. GLOCHIDION ZEYLANICUM, A. Juss.; F. B. I. v. 310.
   N. Circars, hills of Godavari; Carnatic, Kambakam Hills in Chingleput; W. Ghâts, from Mysore southwards, in evergreen forests up to 3,000 ft., common along streams and in swampy places (Bourdillon).

A small tree, reaching 30 ft. in height, the flowers yellow, the capsules orange, the stipules reflexed. As also with *G. tomentosum*, the old leaves when dry are whitish above, almost bullate and very brittle. The variety *G. canaranum*, Miq. (Hohenacker), has rather smaller leaves and a round, prominently-beaked capsule.

4. GLOCHIDION VELUTINUM, Wt. Ic. t. 1907, fig. 2; F. B. I. v. 322.

N. Circars, Ganjam to Godavari, up to 4,500 ft. on Mahendragiri (Fischer and Gage); Carnatic, Shevaroy Hills of Salem (Perrottet); W. Ghâts, Nilgiris, Anamalais, Pulneys and hills of Travancore, up to 6,000 ft.

A small tree. Bark brown, rough; wood red, hard, not used.

5. GLOCHIDION ARBOREUM, Wt. Ic. t. 1907, fig. 1; F. B. I. v. 316.

W. Ghâts, Sivagiri Hills of Tinnevelly.

A small tree, the inflorescence branchlets zigzag, the ♀ pedicels elongate in fruit.

6. GLOCHIDION JOHNSTONEI, Hook. f.; F. B. I. v. 314.

W. Coast and W. Ghâts, in Cochin (Johnstone); Mysore, at 2,000 ft. (Meebold).

Apparently a small tree with long angular branchlets.

7. GLOCHIDION SISPARENSE, Gamble, n. comb. *G. arboreum*, Hook. f.; F. B. I. v. 316 *in part, not of* Wt.

W. Ghâts, Sispara in Nilgiris at 5,000 ft. (Wight, Lawson, Gamble).

A tree with glabrous leaves and few and distant flowers, the lobed calyx pubescent.

8. GLOCHIDION PAUCIFLORUM, Gamble, n. comb. *G. arboreum* var. *pauciflorum*. Hook. f. in Hb. Kew.

W. Ghâts, Sholas of the Nilgiri and Pulney Hills, about 5,000–7,000 ft.

A rather common tree, very near the last and also with few-flowered clusters, but with narrower more reticulate leaves and large capsule, the leaves nearly black when dry.

9. GLOCHIDION NEILGHERRENSE, Wt. Ic. ii. 29; F. B. I. v. 316; Bedd. Fl. t. 277.

W. Ghâts, Nilgiri Hills above 5,000 ft. in Shola forests, common; hills of N. Coimbatore.

A moderate-sized tree with many-flowered clusters i zigzag branches, the leaves usually black when dry or th upper side greenish. Bark reddish-brown, thin, peelin off in flakes; wood red, moderately hard. Vern. *Badag* Hanikay.

10. GLOCHIDION FAGIFOLIUM, Hook. f.; F. B. I. v. 312.

W. Ghâts, Nilgiris, in Shola forests on the downs abou 7,000 ft.

A tree, the thin leaves prominently reticulate and ofte greenish-brown when dry.

11. GLOCHIDION ELLIPTICUM, Wt. Ic. t. 1906; F. B. I. v. 321 *G. Hohenackeri*, Bedd.; F. B. I. v. 314.

W. Ghâts, all Districts, in evergreen forests, up to abou 4,000 ft.

A moderate-sized tree.

Var. *Ralphii*. *G. Ralphii*, Hook. f.; F. B. I. v. 314. Branch lets very slender; leaves smaller, scarcely 2·5 in. long, ·75 in broad; flowers, especially ♀, very small. S. Tinnevelly, at 3,50 ft. (Beddome).

12. GLOCHIDION MALABARICUM, Bedd.; F. B. I. v. 319.

W. Ghâts, Coorg to Travancore, at low levels; Pulne Hills (?) (Bourne).

A small tree, the leaves with prominent curved an arching nerves.

13. GLOCHIDION BOURDILLONII, Gamble in Kew Bull. 1925 330. *G. rigidum*, Bourd. Trav. Trees 334.

W. Ghâts, evergreen forests at low levels up to 4,000 ft. in ravines and near streams (Bourdillon).

A small evergreen tree, the leaves reticulate.

21. Aporosa, Blume.

Trees. *Leaves* alternate, entire or rarely sinuate-toothed stipules small. *Flowers* dioecious, ♂ minute, in axillary solitary or clustered catkin-like spikes, ♀ in short bracteate spikes *Calyx*-lobes 3–6, usually 4, membranous, the ♀ larger than in ♂. *Petals* 0. *Stamens* 1–5, central; filaments capillary, anther didymous. *Disk* 0. *Ovary* 2-, rarely 3-celled; ovules 2 in each cell; stigmas small, plumose, spreading and recurved; pistillode in ♂ minute or 0. *Fruit* an ellipsoid ovoid or globose capsule opening irregularly or partially 2–4-valved; epicarp thin o

thick and spongy or fleshy, endocarp thin, often separable; cells glabrous or hairy within. *Seeds* oblong or suborbicular, usually plano-convex; albumen fleshy; cotyledons broad, flat.

Capsule smooth or rugose when dry, glabrous or hairy:—
Capsule glabrous:—
Capsule globose, pedicelled, ·4 in. in diam.; ♂ catkins up to 2 in. long; leaves elliptic-oblong, acuminate, rounded or acute at base, up to 7 in. long, 3 in. broad .....1. *Lindleyana.*
Capsule fusiform, beaked, up to ·75 in. long, ♂ catkins stout, up to 1 in. long; leaves obovate or orbicular, obtuse or retuse, cuneate at base, up to 5 in. long, 3 in. broad .....2. *fusiformis.*
Capsule sparsely villous, ovoid, ·5 in. long; ♂ catkins very short scarcely ·5 in. long; leaves lanceolate, caudate acuminate, acute at base, up to 4 in. long, 1·5 in. broad .....3. *acuminata.*
Capsule ovoid, covered with long soft processes and rugose, beaked, up to 1 in. long; ♂ catkins ·75 in. long, prominently bracteate; leaves oblong, long and often caudately acuminate, rounded at base, pubescent on the nerves, up to 6 in. long, 2 in. broad
4. *Bourdillonii.*

1. APOROSA LINDLEYANA, Baill.; F. B. I. v. 349; Bedd. Fl. t. 286. *Scepa Lindleyana*, Wt. Ic. t. 361.
W. Ghâts, from S. Canara and Mysore to Anamalais and Travancore Hills, in evergreen forests up to 3,000 ft.
A small or medium-sized evergreen tree with coriaceous leaves. Bark brown, smooth; wood brown, rough, said to be useful. Vern. *Kan.* Sulla, sali; *Tam.* Vittil; *Mal.* Vetti.

2. APOROSA FUSIFORMIS, Thw.; F. B. I. v. 351.
W. Ghâts, hills of Travancore, in evergreen forest at 2,000–3,000 ft. (Bourdillon).
A small tree with very coriaceous leaves in Ceylon, rather less so in Madras.

3. APOROSA ACUMINATA, Thw.; F. B. I. v. 348.
W. Ghâts, Anamalais and hills of Travancore, in evergreen forests up to 3,000 ft.
A small tree, sometimes a shrub.

4. APOROSA BOURDILLONII, Stapf in Hook. Ic. t. 2204.
W. Ghâts, evergreen forests of N. Travancore at low levels (Bourdillon).
A small tree, reaching 25 ft. in height.

22. Baccaurea, Lour.

Trees. *Leaves* alternate, entire or rarely crenate-serrate, penni-nerved, stipules caducous. *Flowers* dioecious, rarely monoecious, in simple or compound spikes or racemes. *Calyx*-lobes 4–5, usually unequal, imbricate. *Petals* 0. *Stamens* 4–8; filaments short, free; anthers small, didymous. *Disk* 0. *Ovary* ovoid or globose, 2–5-celled; ovules 2 in each cell; stigmas 2–5, small, sessile, free or connate in a short style; pistillode in ♂ flowers pubescent, orbicular, sessile or stipitate. *Fruit* an ovoid globose obovoid or fusiform 2–4-celled capsule, late dehiscing; pericarp thick or thin, coriaceous, crustaceous, or woody. *Seeds* broad, compressed; testa with a thick aril-like covering; albumen hard or fleshy; cotyledons flat.

BACCAUREA COURTALLENSIS, Muell. Arg.; F. B. I. v. 367.. *B. sapdia*, Bedd. Fl. t. 280. *Pierardia macrostachys*, Wt. Ic. tt. 1912, 1913.

W. Ghâts, from S. Canara southwards, in evergreen forest, up to 3,000 ft.

An evergreen tree remarkable for the flowers growing in long racemose spikes, in tufts on tubercles on the stems and branches, often "in great profusion, the whole trunk appearing as a crimson mass (Bedd.)." Leaves oblanceolate, acuminate, up to 7 in. long, 3 in. broad. Fruit crimson, about 1 in. in diam., edible. Bark pale brown, rough; wood yellowish-white. Vern. *Kan.* Koli kuki; *Mal.* Mutta Thuri.

23. Daphniphyllum, Blume.

Trees, branches stout, the leaves near the tops. *Leaves* alternate, entire, long-petioled, usually glaucous beneath. *Flowers* dioecious, sometimes monoecious in axillary racemes. *Calyx*-lobes 3–8, small. *Petals* 0. *Stamens* 5–12, free; anthers large, the cells parallel, dehiscing laterally, connective apiculate. *Disk* 0. *Ovary* imperfectly 2-celled; ovules 2 in each cell; stigmas thick, recurved, undivided; pistillode in ♂ 0. *Fruit* an ovoid or oblong drupe, the pericarp woody. *Seed* solitary; testa membranous; albumen copious fleshy; embryo small, the cotyledons narrow.

DAPHNIPHYLLUM NEILGHERRENSE, Rosenth. *D. glaucescens*, Muell. Arg., *not of* Bl.; F. B. I. v. 353. *D. Roxburghii*, Baill.; Bedd. Fl. t. 288. *Goughia neilgherrensis*, Wt. Ic. tt. 1878, 1879.

W. Ghâts, Shola forests of the Nilgiris and southwards, above 5,000 ft.; Bababudan Hills of Mysore.

A medium-sized evergreen tree with elliptic or obovate-oblong obtuse leaves, usually glaucous beneath, reaching 5 in. by 3 in., the petioles 2 in., the drupe ·5 in. long, greenish-red. Bark brown, somewhat corky; wood grey, even-grained. only used as fuel. Vern. *Badaga* Nir kocki; Nir chappay.

24. Putranjiva, Wall.

Trees. *Leaves* alternate, evergreen, entire or serrulate, reticulate. *Flowers* monoecious or dioecious, axillary, ♂ in clusters, ♀ subsolitary. *Calyx*-lobes 3-6, imbricate. *Petals* 0. *Stamens* 2–4 in the centre of the flower, filaments free or connate; anthers erect, the cells parallel. *Disk* 0. *Ovary* ovoid, 2–3-celled; ovules 2 in each cell; styles 2–3, spreading, dilated into broad fleshy stigmas. *Fruit* an ovoid or globose drupe with hard endocarp. *Seed* solitary, ovoid: testa crustaceous; albumen fleshy; cotyledons obovate, cordate, flat.

PUTRANJIVA ROXBURGHII, Wall.; F. B. I. v. 336; Wt. Ic. t. 1876; Bedd. Fl. t. 275; Brand. For. Fl. t. 53.

N. Circars, Deccan and Carnatic, also in suitable places in Malabar, usually on river banks and in shady valleys, up to about 2,000 ft.

A moderate-sized evergreen tree with coriaceous, elliptic-oblong, serrulate leaves up to 4 in. long, 1·5 in. broad. Bark dark grey with horizontal lenticels; wood grey, moderately hard, close-grained, useful for small purposes. The nuts are strung in necklaces and rosaries. Vern. *Hind.* Jia puta, putranjiva; *Ur.* Paishandia; *Tel.* Kadrajuvi; *Tam.* Karupala.

25. Mischodon, Thw.

Tree. *Leaves* whorled, coriaceous, entire, penninerved. *Flowers* dioecious, in axillary panicles, the ♀ elongating in fruit. *Calyx*-lobes 5–8, usually 6, imbricate, often unequal. *Stamens*

usually 6, exserted, the filaments free, villous, as are the anthers, which dehisce longitudinally. *Disk* in ♂ 0, in ♀ annular. *Ovary* 3–4-celled; ovules 2 in each cell; stigmas 3–4, large, sessile, flat; pistillode in ♂ 3-lobed. *Fruit* a capsule of 3 2-valved cocci. *Seeds* 1–2 in each coccus, testa crustaceous, shining; albumen fleshy; cotyledons broad, flat.

MISCHODON ZEYLANICUS, Thw.; F. B. I. v. 344; Bedd. Fl. t. 290.

W. Ghâts, Anamalai Hills (Beddome), hills of Tinnevelly; common in Ceylon.

A large tree with bluntly tetragonous branchlets, and linear-oblong leaves reaching 8 in. long and 2·5 in. broad, but usually narrower, the young ones bright red. The capsules are large, ·75 in. in diam. Trimen says the timber is excellent. Vern. *Tam.* Tampanai.

26. Bischofia, Blume.

Large tree. *Leaves* alternate, 3-foliolate, often crenate. *Flowers* dioecious, minute, in axillary or lateral panicled racemes; ♂ scattered or clustered, ♀ scattered longer-pedicellate. *Calyx*-lobes 5, ♂ concave, obtuse, enclosing the anthers but later reflexed, ♀ ovate, caducous. *Petals* 0. *Stamens* 5, filaments short, anthers large with parallel cells; staminodes in ♀ small or 0. *Disk* 0. *Ovary* 3–4-celled; ovules 2 in each cell; styles long, linear, stigmatic on the inner face; pistillode in ♂ a flat disk on short stalk. *Fruit* a globose fleshy berry with 3–4-cells lined with a parchment-like 2-valved endocarp. *Seeds* oblong-trigonous; testa crustaceous; albumen fleshy; cotyledons flat, ovate.

BISCHOFIA JAVANICA, Bl.; F. B. I. v. 344; Bedd. Fl. t. 259. *Microelus Roeperianus* W. & A.; Wt. Ic. t. 1880.

N. Circars, Deccan and Carnatic, in hilly country, in ravines up to 4,000 ft., W. Ghâts, in evergreen forests, in all Districts.

A large deciduous tree, the large leaflets elliptic-ovate crenate up to 5 in. long. Bark rough, brown; wood red, smooth, moderately hard, useful for planking and other purposes. Vern. *Hind.* Kein; *Tam.* Thondi, Milachityan; *Mal.* Thirippu, nira.

27. Croton, Linn.

Trees or shrubs, rarely herbs. *Leaves* alternate, rarely opposite or whorled, usually 2-glandular at the base; stipules linear. *Flowers* usually monoecious, solitary or clustered on the rhachis of a terminal raceme; bracts small. *Calyx* 5- (rarely 4- or 6-) partite, the lobes imbricate or valvate. *Petals* 5 (rarely 4 or 6), in ♂ usually smaller than the calyx-lobes, in ♀ very small or 0. *Disk* annular or of glands opposite the calyx-lobes. *Stamens* many, inserted on the villous receptacle; filaments free, inflexed in bud, then erect; anther-cells parallel. *Ovary* 3- (rarely 2–4-) celled; ovule solitary in each cell; styles long, 2–4-cleft, slender; pistillode in ♂ 0. *Fruit* a capsule 3-valved or of 3 deciduous 2-valved cocci. *Seeds* 3, smooth, carunculate; testa crustaceous; albumen copious; cotyledons flat.

Ovary covered with stellate scales or tomentum :—

Inflorescence scaly :—

Leaves covered on under-surface, often also above, with stellate silvery or yellowish scales :—

Leaves entire :—

Leaves elliptic-, ovate-, or linear-lanceolate, long-acuminate, shortly triple-ribbed, up to 8 in. long, 2·5 in. broad; petiole up to 1·5 in. long; stamens many, filaments glabrous; capsule ·5 in. long ..... 1. *reticulatus.*

Leaves ovate or rhombic-ovate, acuminate, cuneate at base; up to 6 in. long, 3 in. broad, petiole to 5 in. long; stamens 10–12, filaments villous; capsule about 1 in. long 2. *malabaricus.*

Leaves crenate, ovate or orbicular, obtuse or slightly acute, cordate at base, tawny or silvery scaly on both surfaces, 3–5-ribbed, up to 4·5 in. long, 3 in. broad, petiole up to 1 in.; stamens 10–12, filaments glabrous; capsule to ·5 in. long 3. *scabiosus.*

Leaves glabrous when old, scaly when quite young, oblong-lanceolate, acute, narrowed at base, crenate-serrate, up to 10 in. long, 3·5 in. broad, petiole to 2 in.; stamens 12, filaments villous below; capsule about ·25 in. long ..... 4. *oblongifolius.*

Inflorescence stellate-tomentose; leaves 3–5-ribbed at base, base and margin with stalked glands :—

Capsule under ·5 in. long, subglobose :—

Leaves membranous, broadly ovate or orbicular, cordate,

crenulate and glandular, nearly glabrous, but scaly on the nerves beneath, up to 4·5 in. long, 3 in. broad, petiole to 6·5 in., tawny-tomentose, racemes slender, the flowers mostly solitary, stamens about 30 .....5. *aromaticus.*

Leaves chartaceous, ovate or lanceolate, acuminate, rounded at base, subentire, fulvous stellate-tomentose beneath, up to 6 in. long, 2·5 in. broad, petiole to 2 in.; racemes elongate, stamens about 20 .....6. *lacciferus.*

Capsule ·75–1 in. long, globose or oblong; leaves ovate or orbicular, cordate, acute or acuminate, irregularly crenate-serrate, glabrous above, stellate-tomentose beneath, up to about 4 in. diam.; racemes slender, flowers in fascicles .....7. *caudatus.*

Inflorescence glabrous or nearly so; leaves 3–5-ribbed at base:—

Side ribs of leaves inconspicuous; leaves membranous, elliptic-ovate or oblong, acute, stellate-hairy only when quite young, entire or serrulate, up to 3·5 in. long, 1·5 in. broad, petiole to 1 in.; racemes slender, to 3 in. long; capsule ·25 in. in diam., nearly glabrous, smooth .....8. *Klotzschianus.*

Side ribs of leaves prominent; leaves membranous, ovate, acuminate serrate, glabrous, up to 6 in. broad, 3 in. broad, petiole to 2 in.; racemes 3 in. long; capsule ·75–1 in., obovoid, smooth .....*Tiglium.*

Ovary glabrous; sepals much enlarged in fruit; leaves chartaceous, prominently 3–5-ribbed at base, ovate, long-acuminate, glabrous when old, up to 5 in. long, 2 in. broad; racemes short; capsule ·7 in. in diam., rugose, glabrous.....9. *Lawianus.*

1. CROTON RETICULATUS, Heyne; F. B. I. v. 386; Bedd. Ic. t. 233.

   W. Ghâts, S. Canara to the Anamalais and Travancore and Tinnevelly Hills, in evergreen forests at 3,000–5,000 ft. A shrub or small tree, the leaves with stalked glands at their base. Vern. *Mar.* Panduray.

2. CROTON MALABARICUS, Bedd. Ic. t. 181; F. B. I. v. 386.

   W. Ghâts in all Western Districts, in evergreen forests at 3,000–4,000 ft.

   A medium-sized tree reaching 30 or even 60 ft. in height, the glands sessile, obscure. Vern. *Tam.* Thavatta polavu; *Mal.* Kóla Vacchi.

3. CROTON SCABIOSUS, Bedd. Fl. t. 283; F. B. I. v. 386.

   Deccan, on dry stony hills in Cuddapah and Kurnool at 1,000–4,000 ft.

A small, often gregarious tree, the leaf-glands sessile. Bark dark brown, rough; wood yellowish white, hard and close-grained. Vern. *Tel.* Yerri chilla.

4. CROTON OBLONGIFOLIUS, Roxb.; F. B. I. v. 386.

N. Circars and Deccan, very scarce; W. Ghâts, S. Canara to Nilgiris, in rather dry forests, not common, but usually in scrub near villages.

A small or medium-sized, deciduous, often gregarious tree, the leaves turning red before falling. Bark grey or brownish; wood yellowish white, moderately hard. Vern. *Tel.* Bhutankusam; *Tam.* Millakumari.

5. CROTON AROMATICUS, Linn.; F. B. I. v. 388 *in part*

Carnatic? (Wight)—Mission Garden, Tranquebar (Wall. Cat. 7773c). A shrub with thin leaves, the capsule ⅓ in. in diam., glabrous except for scabrid hairs.

6. CROTON LACCIFERUS, Linn.; Wt. Ic. t. 1915. *C. aromaticus*, Linn.; F. B. I. v. 388 *in part.*

W. Ghâts, in rather dry open and Shola forests of the Nilgiris, Anamalais and hills of Travancore and Tinnevelly, usually at 4,000–7,000 ft., sometimes lower; Kollimalai Hills of Trichinopoly; Babubudan Hills of Mysore

A shrub or small tree, slightly aromatic, the leaves turning red before falling, the capsule very scabrid, ¼–⅓ in. in diam. Vern. *Tam.* Teppaddi.

7. CROTON CAUDATUS, Geisel; F. B. I. v. 388.

W. Ghâts, Wynaad, Anamalais and hills of S. Travancore, up to 3,000 ft., scarce and usually near streams.

A subscandent shrub with long branchlets and large thick-shelled capsules.

8. CROTON KLOTZSCHIANUS, Thw.; F. B. I. v. 392. *Tiglium Klotzschianum*, Wt. Ic. t. 1914.

Carnatic, Kambakam Hills of Chingleput; Deccan, hills of Cuddapah and Kurnool, in dry evergreen forest; W. Ghâts, hills of Tinnevelly at 1,000–3,000 ft. on E. side.

A shrub or small tree, most usually straggling among other bushes.

9. CROTON LAWIANUS, Nimmo; F. B. I. v. 394.

Bababudan Hills of Mysore (Law).

A small tree with slender branches.

C. Tiglium, Linn. (Vern. *Hind.* Jaipal; *Tam.* Nirvalam) is a

North Indian small tree, frequently found in cultivation in the Madras plains. It is the source of the powerful medicine Croton oil. *C. sparsiflorus*, Morong, is an introduced American weed, which, having first arrived in Bengal (Burkill in 'As. Soc. Pro.' 1910), has now wandered south along the Coromandel Coast even to Tinnevelly (Rangachari).

28. Chrozophora, Neck.

Coarse herbs, less often undershrubs, usually clothed with stellate tomentum. *Leaves* alternate, petioled, sinuate-toothed or -lobed, plicate, rugose or bullate or nearly flat, often biglandular at the apex of the petiole. *Flowers* monoecious, in short dense racemes in the upper leaf-axils, the ♂ crowded near the top, subsessile, the ♀ below, pedicelled. *Calyx* 5-lobed, in the ♂ closed in bud, afterwards spreading, in the ♀ much narrower, nearly setaceous. *Petals* 5, alternate with and like the calyx-lobes, but smaller. *Disk* of 5 glands alternate with the petals. *Stamens* 5–15, the filaments connate, at least below, in a column; anther-cells oblong, parallel. *Ovary* 3-celled; ovule 1 in each cell; styles 3, each bifid; pistillode in ♂ 0. *Fruit* a 3-lobed capsule of 3 hispid tomentose or scaly 2-valved cocci. *Seeds* without caruncle, globose; testa shining; albumen fleshy; cotyledons flat.

Stems prostrate; racemes short; capsules ·1–·2 in. in diam., nearly black with grey stellate tomentum, not tinctorial :—

Leaves not glandular at base, ovate or suborbicular, ·5–1 in. in diam., usually strongly wrinkled and bullate, the large stellate hairs stalked; anthers short, under ·1 in. long ..... 1. *prostrata.*

Leaves 2-glandular at base, ovate or lanceolate, 1 to nearly 2 in. long, only slightly bullate, the stellate hairs sessile; anthers longer, about ·1 in. long ..... 2. *parvifolia.*

Stems erect; racemes elongate; capsules ·3 in. in diam., reddish, with dense stellate tomentum, tinctorial when wetted; leaves broadly ovate-orbicular, 3-lobed, undulate crenate, with sessile stellate hairs, 2–4 in. in diam., petiole to 2 in.; anthers over ·1 in. long 3. *Rottleri.*

1. Chrozophora prostrata, Dalz.; Prain in Kew Bull. 1918, 90. *C. plicata* 3; F. B. I. v. 410.

N. Circars and Carnatic in damp places as on the edge of rivers and tanks and dried-up irrigated fields.

An annual herb with prostrate branches, yellow petals, orange stigmas and capsules not giving a colour when wetted.

2. CHROZOPHORA PARVIFOLIA, Klotzsch; Prain l.c. 91. *C. plicata* 2; F. B. I. v. 410.

N. Circars, banks of the Godavari (Barber), Carnatic, near Madras; Deccan, in Anantapur (Gamble).

A prostrate herb with rather thin leaves.

3. CHROZOPHORA ROTTLERI, Klotzsch; Prain l.c. 95. *C. plicata* 1; F. B. I. v. 410.

N. Circars, Deccan and Carnatic, West to the E. slopes of the Ghâts, in dry places, and on road-sides.

An erect herb or undershrub with large leaves, yellow petals and red stigmas, the capsules giving a blue colour when wetted.

29. Agrostistachys, Dalz.

Shrubs or small trees. *Leaves* alternate, entire or serrate, penninerved. *Flowers* dioecious, in axillary or supra-axillary bracteate racemes or spikes, ♂ solitary or clustered within the bract, ♀ solitary. *Calyx* globose, splitting into 2–5 valvate lobes. *Petals* usually 5, shorter than the calyx-lobes in ♂, longer in ♀ but caducous. *Disk* large, of glands alternate with the petals. *Stamens* 8–13 on a conical receptacle, filaments nearly free; anthers versatile, the cells globulous from a thickened connective. *Ovary* 3-celled; ovule 1 in each cell; styles short, thick, spreading; pistillode in ♂ usually large. *Fruit* a capsule, of 3 2-valved cocci. *Seeds* globose; testa crustaceous; albumen fleshy, cotyledons flat.

Leaves strongly serrate, elliptic-oblong or -lanceolate, acute at both ends, up to 15 in. long, 4 in. broad: ♂ racemes small, catkin-like, in axillary clusters; ♀ flowers solitary: stamens clustered within the disk ..... 1. *indica.*

Leaves entire, oblanceolate, very coriaceous, up to 15 in. long; flowers in elongate spiciform racemes; stamens 10, 5 within the disk, 5 outside it; capsule ·5 in. broad ..... 2. *Meeboldii.*

1. AGROSTISTACHYS INDICA, Dalz.; F. B. I. v. 406; Bedd. Ic. t. 241.

W. Ghâts, in evergreen forests in all districts, up to 6,000 ft., usually on the banks of streams.

A shrub or small tree.

2. AGROSTISTACHYS MEEBOLDII, Pax and K. Hoffm., in Engl. Pflznreich. iv. 147, vi. 100. *A. longifolia*, Benth.; F. B. I. v. 407 *in part*. *Sarcoclinium longifolium*, Wt. Ic. tt. 1887, 1888.
W. Ghâts, in Wynaad, Anamalais and hills of Travancore and Tinnevelly, in evergreen forest at 2,000–5,000 ft
A small tree with large thick leaves. Bark thin, dark; wood pale brown, moderately hard, not durable. Vern. *Tam.* Mancharei; *Mal.* Mulimpala.

30. Aleurites, Forst.

Trees, often stellately pubescent or lepidote. *Leaves* alternate, long-petioled, entire or lobed, digitately 3–7-nerved at the base; petiole 2-glandular at apex. *Flowers* monoecious or subdioecious, in lax terminal panicled cymes. *Calyx* subglobose in bud, bursting irregularly into 2–3 valvate lobes. *Petals* 5, elongate and conspicuous. *Stamens* many, on a conical receptacle, the outer 5 alternating with the small disk-glands; filaments free; anthers erect, adnate, the cells parallel. *Disk* of 5 small glands, obscure in ♀. *Ovary* 2–5-celled; ovule solitary in each cell; styles with 2 stout linear arms. *Fruit* a large drupe with a hard, 1–5-celled stone. *Seed* with a thick woody testa, albumen thick, hard; cotyledons broad, flat.

ALEURITES MOLUCCANA, Willd.: F. B. I. v. 384; Bedd. Fl. t. 276.
Introduced from Malaya, now found run wild in some places, especially the Wynaad; often planted. Belgaum Walnut. A handsome tree with large long-petioled leaves of various shapes, chiefly deltoid or rhomboid and often 3–7-lobed. The flowers are in large tomentose cymes with white petals and the drupe is fleshy, ovoid, pointed, giving edible kernels full of a drying oil.

31. Trewia, Linn.

Trees. *Leaves* opposite, entire, broadly ovate or orbicular; 3–5-ribbed at base. *Flowers* dioecious, appearing before the leaves, ♂ in drooping racemes, ♀ long-peduncled, solitary or racemose. *Calyx* in ♂ globose in bud, then splitting into 3–4 concave, often reflexed, imbricate lobes; in ♀ of 3–5 imbricate caducous lobes. *Petals* 0. *Disk* 0. *Ovary* 2–4-celled: ovule 1

in each cell; styles 3–5, connate below, very long, papillose. *Fruit* a 2-4-celled drupe, indehiscent or sometimes dehiscent, with usually fleshy pericarp and crustaceous endocarp. *Seeds* ovoid; testa hard; albumen fleshy; cotyledons broad, flat.

End branchlets usually cottony-tomentose; leaves cordate at base, rarely truncate; racemes in ♂ long, in ♀ with few flowers, usually 1 only; drupe with thick pericarp, indehiscent 1–1·5 in. in diam. 1. *nudiflora.*

End branchlets usually glabrous; leaves truncate at base, rarely slightly cordate, sometimes slightly cuneate; racemes in ♂ short, in ♀ many-flowered; drupe with thin loculicidally dehiscing pericarp, about ·5 in. in diam. ..... 2. *polycarpa.*

1. TREWIA NUDIFLORA, Linn.; F. B. I. v. 423; Wt. Ic. t. 1870 ♂

   N. Circars, up to 3,000 ft. in the hills, and chiefly in wet places and along streams, rare elsewhere, and perhaps usually only cultivated.

   A deciduous tree with large leaves rather like those of *Gmelina arborea.* Bark smooth, grey; wood white, soft, used for drums and for the carved images in Roman Catholic Churches (Bourdillon). Vern. *Hind.* Gambhar; *Ur.* Mondu.

2. TREWIA POLYCARPA, Benth.; F. B. I. v. 424. *T. nudiflora*, Wt. Ic. t. 1871 ♀; Bedd. Fl. t. 281.

   W. Coast and W. Ghâts, in Malabar and Travancore, at low levels, in wet places and along streams.

   A tree reaching 50 ft. in height, with white wood, used as that of the former species. Vern. *Tam.* Ana thuvarei; *Mal.* Pambara Kumbil.

32. Mallotus, Lour.

Trees or shrubs. *Leaves* opposite or alternate, entire toothed or lobed, 3–7-ribbed or penninerved, sometimes peltate, often gland-dotted beneath, sometimes with glandular areas near the base above; stipules often present. *Flowers* dioecious or monoecious, in axillary or terminal simple or branched spikes or racemes, bracteate. *Calyx* in ♂ at first globose or ovoid, later separating into 3–5 valvate lobes; in ♀ spathaceous or valvately 3–5-lobed. *Petals* 0. *Disk* 0. *Stamens* 20–30 or more, central

filaments free; anthers parallel, separated by a wide connective. *Ovary* 2–4-celled; ovule 1 in each cell; styles free or connate below, above spreading and plumose or papillose; pistillode in ♂ ♀. *Fruit* a capsule of 2–3 cocci, each 2-valved, smooth, tubercled or echinate with hard or soft spines, usually very glandular. *Seed* ovoid or globose; testa crustaceous; albumen fleshy; cotyledons flat.

Leaves nearly or quite as broad as long, usually deltoid, ribbed from the base :—

Climbing or straggling shrub; leaves broadly deltoid-ovate, entire or sinuate, 3-ribbed, about 3 in. long, softly stellate-pubescent and glandular; capsules 2-valved, fulvous-tomentose, ·5 in. in diam.; seeds black ..... 1. *repandus.*

Tree with thick grey or tawny tomentose branches; leaves narrowly (broadly when young) peltate, broadly ovate, orbicular or deltoid, entire or shortly lobed, 3–5-ribbed, up to 10 in. in diam., densely white or fulvous stellate-tomentose; capsules 3–4-valved, ·5 in. in diam., echinate with soft woolly spines and fulvous-tomentose: seeds black ..... 2. *albus.*

Leaves longer than broad :—

Leaves 3-ribbed at the base, very narrowly or not peltate :—

Leaves opposite, the petioles of the pairs unequal in length, ovate, acuminate, reticulate, entire or slightly sinuate, up to 10 in. long, 5 in. broad, pale when dry, and not glandular beneath; capsule 3-valved, ·5 in. in diam., fulvous stellate-tomentose: seeds brown ..... 3. *distans.*

Leaves opposite and alternate, ovate-oblong or lanceolate, acute, the transverse nervules prominent, entire or slightly sinuate, up to 7 in. long, 2·5 in. broad, brown when dry, and yellow-glandular beneath; capsule 3-valved, ·3 in. in diam., minutely pale brown stellate tomentose; seeds brown ..... 4. *rhamnifolius.*

Leaves alternate, ovate or ovate-lanceolate, acuminate, the transverse nervules prominent, entire or shortly serrate, up to 8 in. long, 4·5 in. broad, greyish-pubescent to fulvous tomentose and red-glandular beneath; capsule 3-valved, ·5 in. in diam., conspicuously red-glandular; seeds black ..... 5. *philippinensis.*

Leaves penninerved, or with sometimes a short opposite pair at the base :—

Leaves opposite or alternate, the lowest pair of nerves opposite and short, elliptic obovate or oblanceolate, acute, cuneate at

base, entire or distantly dentate, glabrous, up to 7 in. long, 2 in. broad; flowers in slender racemes .....6. *atrovirens.*

Leaves opposite, without a short opposite lowest pair of nerves: —

Capsules when mature with hard conical spines:—

Capsules ·3 in. in diam., prominently yellow-glandular with few scattered spines; style-column elongate; leaves variable, elliptic-ovate or lanceolate, usually narrowed at both ends, up to 6 in. long, 2 in. broad, entire or sinuate 7. *stenanthus.*

Capsules ·5 in. in diam., sparsely yellow-glandular with many regular spines roughly in lines on the back; style-column very short or 0; leaves rhombic-lanceolate or -oblanceolate, narrowed at both ends, up to 5 in. long, 1·5 in. broad, entire or sinuate-dentate .....8. *muricatus.*

Capsules ·5 in. in diam., the cocci somewhat elongate, minutely pubescent and with spines short when mature, elongate and soft when young; style-column short; leaves lanceolate or oblanceolate, long, but bluntly acuminate, reticulate, up to 7 in. long, 2 in. broad, widely sinuate-dentate 9. *aureo-punctatus.*

Capsules when mature with subulate soft villous processes; leaves elliptic or slightly obovate, long and obtusely caudate-acuminate at apex, slightly attenuate at base, undulate, with prominent nerves and transverse nervules, up to 9 in. long, 3·5 in. broad.....10. *Beddomei.*

1. MALLOTUS REPANDUS, Muell. Arg.; F. B. I. v. 442.

N. Circars, Deccan and Carnatic to S. Travancore, at low levels, often in hedges and scrub forests and near the coast.

A large shrub, the trunk with long thorns, the ♂ flowers in panicles, the ♀ in racemes. Vern. *Hind.* Akús; *Tel.* Kanda veltu.

2. MALLOTUS ALBUS, Muell. Arg.; F. B. I. v. 429. *Rottlera peltata*, Wt. Ic. t. 1873.

Var. *occidentalis*, Hook. f.

W. Ghâts, in all Districts, in evergreen and secondary forest up to 4,000 ft.; Shevaroy Hills of Salem; Kollimalai Hills of Trichinopoly.

A moderate-sized tree, the flowers in panicles. Bark thin, grey; wood white and soft, of no value. Vern. *Tam.* Mullu polavu; *Mal.* Vatta kumbil.

3. MALLOTUS DISTANS, Muell. Arg.; F. B. I. v. 441; Bedd. Ic. t. 232.

W. Ghâts, Anamalais and hills of Tinnevelly about Courtallum.

A straggling shrub, the flowers in usually distant fascicles.

4. MALLOTUS RHAMNIFOLIUS, Muell. Arg.; F. B. I. v. 440.

W. Ghâts, hills of Tinnevelly and Travancore.

A shrub or small tree, resembling the next in leaf but at once distinguished by the capsule with nearly separate cocci and not red.

5. MALLOTUS PHILIPPINENSIS, Muell. Arg.; F. B. I. v. 442; Bedd. Fl. t. 289. *Rottlera tinctoria*, Roxb. Cor. Pl. t. 168.

All Forest Districts in N. Circars, Deccan and W. Ghâts, also in hills of Carnatic, up to 5,000 ft., common, especially in deciduous forest and open scrub lands.

A small tree, much branching low down. Bark grey; wood grey to light red, smooth and close-grained, a good fuel. The chief product is the red powder (Kamela) on the capsules which affords a bright orange dye. Vern. *Hind.* Raini; *Ur.* Sinduri; *Tel.* Kumkuma; *Tam.* Kapli; *Mal.* Manjana.

Var. *tomentosus*. Leaves beneath densely fulvous-tomentose, acute to cuspidate-acuminate.

W. Deccan, hills of Bellary and N. Coimbatore to N. and E. slopes of Nilgiris, common on the Coonoor Ghât up to 6,000 ft., also in Pulneys.

6. MALLOTUS ATROVIRENS, Hook. f.; F. B. I. v. 440.

W. Ghâts, forests of Cochin and Travancore, at low levels; Anamalais (Beildome).

A shrub (?), the capsules unknown.

7. MALLOTUS STENANTHUS, Muell. Arg.; F. B. I. v. 437.

W. Ghâts, Anamalais and hills of Travancore and Tinnevelly.

A small tree with rough branches and usually flattened branchlets, the leaves narrower and more acuminate at both ends than in Bombay specimens.

8. MALLOTUS MURICATUS, Bedd.; F. B. I. v. 436 *Claoxylum muricatum*, Wt. Ic. t. 1886.

Deccan, Horsleykonda in Chittoor, at 3,500 ft. (Fischer); Carnatic, Kollimalai Hills of Trichinopoly (Rangachari);

W. Ghâts, Anamalais and hills of Travancore and Tinnevelly.

A tree with much compressed branchlets and leaves very variable in shape but more or less rhombic.

9. MALLOTUS AUREO-PUNCTATUS, Muell. Arg. *M. Lawii*, Hook. f.; F. B. I. v. 438 *in part.*

W. Ghâts, in Cochin (Johnson), Rookwood Estate, Travancore, at 2,000 ft. (Lawson), hills of Tinnevelly.

A small tree (Lawson).

10. MALLOTUS BEDDOMEI, Hook. f.; F. B. I. v. 438.

W. Ghâts, Wynaad, Anamalais and hills of Travancore and Tinnevelly, up to 5,000 ft.; Bolampatti Hills of Coimbatore at 4,300 ft. (Fischer).

A shrub (Meebold) with large leaves.

33. Symphyllia, Baill.

Trees. *Leaves* alternate, entire or toothed; stipules 2. *Flowers* monoecious, in terminal or axillary spiciform racemes, the ♂ very numerous, clustered, the ♀ few, at the base only. *Calyx* in ♂ at first globular, then breaking into 4–6 valvate lobes; in ♀ of 5–8 unequal linear lobes. *Petals* 0. *Disk* 0. *Stamens* as many as the calyx-lobes, exserted; filaments at first inflexed; anthers dorsifixed, the cells parallel, often glandular at base. *Ovary* 3-celled; ovule 1 in each cell; styles connate below, spreading and bifid above and again divided in plumose arms; pistillode in ♂ columnar. *Fruit* a 3-lobed capsule. *Seeds* globose; testa crustaceous; albumen fleshy; cotyledons flat.

SYMPHYLLIA MALLOTIFORMIS, Muell. Arg. *Adenochlaena indica*, Hook. f.; F. B. I. v. 418. *Cephalocroton indicum*, Bedd. Fl. t. 261.

Deccan, hills of Cuddapah, along streams at about 3,000 ft. (Fischer); W. Ghâts, from S. Canara and Coorg to Nilgiris, Anamalais and the hills of Travancore and Tinnevelly, in evergreen forests, about 3,500 ft.

A tree with elliptic coriaceous shining entire leaves up to 7 in. long, 3·5 in. broad, very small flowers in close spikes and a grey capsule ·75 in. in diam.

34. Coelodepas, Hassk.

Trees. *Leaves* alternate, oblong, entire or toothed, penni-nerved. *Flowers* monoecious or dioecious, in axillary spikes or clusters, the ♂ elongate, slender. *Calyx* in ♂ globose, splitting into 3–4 valvate lobes; in ♀ cupular, often enlarged in fruit, 4–10-lobed, the lobes imbricate. *Petals* 0. *Disk* 0. *Stamens* 4–8, the filaments cuneately dilated from below upwards; anthers didymous. *Ovary* 3-celled; ovule 1 in each cell; styles flattened, spreading, lobed; pistillode in ♂ minute. *Fruit* a capsule of 3, 2-valved, stellately pubescent cocci. *Seeds* subglobose; testa crustaceous; albumen fleshy; cotyledons flat.

COELODEPAS CALYCINUM, Bedd. Fl. t. 320; F. B. I. v. 419.

W. Ghâts, hills of Tinnevelly near Papanassam (Beddome). Sivagiri Hills (Wight).

A small tree with oblong acuminate crenate leaves reaching 7 in. long, 2 in. broad; ♂ flowers in very slender interrupted spikes of clusters and ♀ flowers in short spikes. The capsule is minutely fulvous tomentose, ·4 in. in diam. Wood very hard (Bedd.). Vern. *Tam.* Kattupira.

35. Alchornea, Sw.

Trees or shrubs. *Leaves* alternate, entire or toothed, ribbed, usually stipellate at the base and glandular above at the base. *Flowers* dioecious or rarely monoecious, small, in simple or panicled spikes or racemes; ♂ small, clustered, ♀ solitary to a bract. *Calyx* in ♂ globose, closed in bud, splitting into usually 4 valvate lobes; in ♀ the 3–6 lobes, usually 4, imbricate. *Petals* 0. *Disk* 0. *Ovary* 2–3-, rarely 4-celled; ovule 1 in each cell; styles distinct usually long and linear, simple or lobed; pistillode in ♂ 0. *Fruit* a capsule of 2–3 2-valved crustaceous cocci. *Seeds* subglobose, not strophiolate; testa crustaceous; albumen fleshy; cotyledons flat.

ALCHORNEA MOLLIS, Muell. Arg.; F. B. I. v. 420.

N. Circars, in the hills, in moist valleys (Roxburgh), at Ettrakonda in Godavari (V. Narayanswami).

A small tree with broadly ovate or suborbicular cuspidate-acuminate villous 3-ribbed stipellate leaves, up to 5 in. long, 3 in. broad, but Roxburgh gives the maximum as 12 and 8,

which is quite likely especially with coppice shoots. The capsule is softly grey-pubescent. Vern. *Tel.* Badeki.

36. Cleidion, Blume.

Glabrous trees. *Leaves* alternate, toothed, penninerved. *Flowers* monoecious or dioecious, ♂ in long axillary racemes; ♀ single or in pairs on a long axillary peduncle; bracts very small. *Calyx* in ♂ globose at first, splitting into 2–4 valvate lobes; ♀ 3–5-lobed, the lobes imbricate. *Petals* 0. *Disk* 0. *Stamens* numerous, in a globose mass on a conical receptacle; filaments free; anthers dorsifixed, 4-celled or 2-celled, the cells transversely didymous on a broad connective. *Ovary* 2–4-celled; ovule 1 in each cell; styles connate below, with 2–3 long filiform arms; pistillode in ♂ 0. *Fruit* a capsule of 1–3 2-valved cocci. *Seeds* subglobose; testa coriaceous, sometimes with another membranous as well; albumen fleshy; cotyledons flat.

CLEIDION JAVANICUM, Blume; F. B. I. v. 444; Bedd. Fl. t. 272. W. Ghâts, in all Districts, in evergreen forests up to 3,000 ft., but not common.

A moderate-sized evergreen tree with elliptic acuminate long-petioled leaves up to 9 in. long, 4 in. broad, and capsules 1 in. in diam. Bark greenish-white, smooth; wood greyish-white, soft and not durable. Vern. *Mal.* Yellari.

37. Macaranga, Thouars.

Trees or shrubs. *Leaves* alternate, often large and peltate, entire or lobed, usually glandular beneath, 3–many-ribbed at the base; petioles often long and stipules large. *Flowers* usually dioecious, in axillary racemes or panicles, bracteate, the ♂ minute, in clusters, the ♀ one or few, to each bract; bract often large. *Calyx* in ♂ globose or obovoid, splitting into 3–5 valvate, lobes; in ♀ 2–4-lobed. *Petals* 0. *Disk* 0. *Stamens* one or more central; filaments short, free; anthers 4-celled, or 2-celled and 4-valved. *Ovary* 2–6-celled, rarely by abortion 1-celled; ovule 1 in each cell; styles entire, short or long; pistillode in ♂ 0. *Fruit* a small capsule of 1 or more 2-valved cocci, sometimes echinate, often glandular or waxy. *Seeds* globose; testa crustaceous; albumen fleshy; cotyledons flat.

Leaves in all large and broadly peltate, orbicular-ovate, acuminate, entire or shortly toothed, with usually 9 radiating ribs at the base, the midrib with 7–12 pairs of nerves, the two next nerved on the outer side, the transverse nervules parallel :—

Panicle branches usually zigzag :—

Floral bracts small, usually with a large flat glandular appendage, the panicle branches shortly jointed; style lateral, subulate, stamens usually about 6–8 .. ..1. *indica.*

Floral bracts boat-shaped, toothed and acuminate, auricled at base, tomentose, the panicle branches with distant slender joints: stamens usually 4–6 .....2. *flexuosa.*

Panicle branches not zigzag; floral bracts broad and close, concealing the flowers, cup-like dentate and obtuse, very tomentose; style lateral, sessile, peltate, stamens 2–5, usually 3 .....3. *peltata.*

1. MACARANGA INDICA, Wt. Ic. t. 1883 and t. 1949 ii; F. B. I. v. 446; Bedd. Fl. t. 287, Fig. A.

   W. Ghâts, Nilgiris, hills of Malabar and Pulneys, at 3,000–6,000 ft. in second-growth forest chiefly.

   A quick-growing tree with glaucous branchlets and large stipules, the leaves with round resinous yellow glands beneath, and usually softly tomentose. Bark grey, smooth; wood greyish-red, soft.

2. MACARANGA FLEXUOSA, Wt. Ic. t. 1949 iii.

   W. Ghâts, at Courtallum in Tinnevelly (Wight).

   A tree with glaucous branchlets and fulvous innovations, the leaves rather thin and greyish beneath with prominent large peltate glands.

3. MACARANGA PELTATA, Muell. Arg. *M. Roxburghii*, Wt. Ic. t. 1949 iv; F. B. I. v. 448. *M. tomentosa*, Wt. Ic. t. 1949 i; Bedd. Fl. t. 287. *Mappa ? peltata*, Wt. Ic. t. 817.

   N. Circars, in hill valleys, especially in Rampa; Deccan, hills of Cuddapah; W. Ghâts, in most Districts, in second-growth forest up to 3,000 ft.

   A small resinous quick-growing tree with glaucous branchlets, large stipules and leaves glandular and more or less villous beneath. Bark pale, with lenticels; wood pale brown, soft, of no value. The red gum can be used for taking impressions. Vern. *Tam.* Vattakanni; *Mal.* Vatta.

38. Claoxylon, A. Juss.

Trees or shrubs, the buds not perulate. *Leaves* alternate, petioled, entire or glandular-dentate; stipules minute, early caducous. *Flowers* dioecious, rarely monoecious, in elongate racemes, often fascicled; bracts in ♂ usually 1-many, in ♀ 1-flowered. *Calyx* in ♂ closed in bud, subglobose, splitting valvately in 2–4 lobes; in ♀ usually 3-lobed. *Petals* 0. *Disk* in ♂ 0, in ♀ of hypogynous glands, free or connate in a cup. *Stamens* 10 or many, usually 20–30; filaments short or long; anthers erect, the cells distinct, connate at the base; often many glands or ciliate scales between the filaments. *Ovary* 2–4-celled; ovule 1 in each cell; styles free or connate only at the base, sometimes fringed. *Fruit* a capsule of 2–3 cocci dehiscing loculicidally. *Seeds* globose, not carunculate, arillate or not; testa crustaceous; albumen fleshy; cotyledons flat.

CLAOXYLON ANOMALUM, Hook. f.; F. B. I. v. 412.

Evergreen forests of Tinnevelly about Courtallum (Wight), about Strathmore in Travancore at 3,500 ft. (Bourdillon).

A shrub with soft branches, oblong-lanceolate acuminate leaves with long petioles, flowers in rather dense spikes having no scales between the stamens and a white-pubescent capsule.

39. Micrococca, Benth.

Herbs or undershrubs, the buds not perulate. *Leaves* alternate, the lower rarely opposite, membranous, dentate, petioled; stipules minute. *Flowers* dioecious or monoecious, minute, in distant clusters on axillary racemes, the clusters often catkin-like with many imbricate bracts; the racemes solitary or fascicled, usually unisexual and various in arrangement; ♂ flowers pedicelled. *Calyx* of ♂ closed in bud, apiculate, splitting into 3 lobes; of ♀ 3–4, larger, imbricate. *Petals* 0. *Disk* in ♀ hypogynous, of linear glands. *Stamens* 3–30, central on a receptacle; filaments erect; anthers erect, the cells distinct obovoid, connate at base: glands or ciliate scales between the filaments. *Ovary* 3-celled; ovules 1 in each cell; styles free, plumose-laciniate. *Fruit* a capsule of 3 cocci dehiscing loculicidally and also septicidally. *Seeds* subglobose with a very thin arillus; testa crustaceous; albumen fleshy; cotyledons flat.

Perennial undershrubs :—

Racemes elongate-filiform, about 4 in. long, glabrous or hispid, the flower-clusters distant; leaves glabrous, elliptic-lanceolate, coarsely dentate or entire, acuminate at both ends, up to 7 in. long, 1·5 in. broad, long-petioled ..... 1. *Beddomei.*

Racemes short, under 2 in. long, hairy, the flower-clusters fairly close; leaves sparsely softly white- or fulvous-silky, lanceolate, entire or crenate, acute at both ends, up to 3 in. long, 1 in. broad (in the var. larger), petioles short ..... 2. *Wightii.*

Annual herbs; racemes erect, androgynous, filiform, up to about 3 in. long, hispid; leaves ovate, acute, usually rounded at base, crenate, up to 2·5 in. long, 1·25 in. broad, the petioles slender 3. *Mercurialis.*

1. MICROCOCCA BEDDOMEI, Prain in Ann. Bot. xxv. 630. *Claoxylon Beddomei*, Hook. f.; F. B. I. v. 413. *C. indicum*, Bedd. Ic. t. 231, *not of* Hassk.

W. Ghâts, Anamalais and hills of Travancore and Tinnevelly, up to 6,000 ft.

An undershrub, nearly glabrous or sparsely hispid on the racemes and branchlets, the capsule glabrous or strigose-hispid.

2. MICROCOCCA WIGHTII, Prain l.c. *Claoxylon Wightii* Hook. f.; F. B. I. v. 413.

W. Ghâts, hills of Tinnevelly (Wight, Beddome).

A slender undershrub with narrow leaves up to 1 in. broad.

Var. *hirsutum*, Prain. *Claoxylon hirsutum*, Hoof. f.; F. B. I. v. 413, leaves larger, densely yellowish-silky with long spreading soft hairs, as is the capsule. Hills of Tinnevelly, Singampatti at the Snake falls 2,500 ft. (Beddome).

3. MICROCOCCA MERCURIALIS, Benth. *Claoxylon Mercurialis*, Thw.; F. B. I. v. 412.

Most plains Districts, a weed of cultivated land and roadsides.

An annual herb, reaching 2 ft. in height, the capsule glabrous or sparsely hispid.

40. Acalypha, Linn.

Herbs or shrubs. *Leaves* alternate, usually serrate or crenate, rarely entire, penninerved or 3–5-ribbed; petioles often long.

Flowers usually monoecious, in axillary or terminal spikes or racemes; ♂ very minute, sometimes separate, sometimes lower, more usually upper, with or without small bracts; ♀ bracteate, the bracts generally leafy and concave; bracteoles very small. ***Calyx*** in ♂ of 4 minute valvate membranous lobes, at first combined; in ♀ of 3–4 minute imbricate lobes. *Petals* 0. *Disk* 0. *Stamens* many, often 8, on a convex receptacle; filaments short, free; anther-cells distinct, divaricate, often at length twisted or flexuous. *Ovary* 3-celled; ovule solitary in each cell; styles filiform, often very long and laciniate; pistillode in ♂ 0. *Fruit* a small capsule of 3 small, 2-valved, crustaceous cocci. *Seeds* subglobose; testa crustaceous; albumen fleshy; cotyledons flat.

Flowers of ♀ pedicelled, with minute bracts, in terminal lax panicles; those of ♂ in very slender axillary spikes; leaves membranous long-petioled, ovate, acuminate, rounded truncate or even cordate at base, strongly serrate, sparsely hairy, up to 4 in. long, 2·5 in broad.

1. *paniculata.*

Flowers of ♀ sessile with fairly large or small bracts :—

Flowers of ♀ in terminal short spikes, of ♂ axillary, in slender spikes; bracts of ♀ broad and dentate, enclosing the capsule; leaves ovate, acute, rounded or cordate at base, crenate, pubescent, up to 2 in. long, 1·25 in broad. ..... 2. *alnifolia.*

Flowers of both ♂ and ♀ in axillary spikes, the ♂ uppermost and few :—

Bracts rather large, ·2–·5 in. long, leafy, dentate, folded, alternate on erect spikes; ♂ flowers minute, followed by a tuft of sterile flowers; leaves long-petioled, ovate or rhombic ovate, acute, cuneate at base, crenate-serrate, up to 3 in. long, 2 in. broad, glabrous ..... 3. *indica.*

Bracts moderate-sized, longer than the capsules, ·15–·3 in. long; spikes short, rarely 1 in. long.—

Bracts deeply 3–5-lobed, the 3 longer lobes strap-shaped, long-ciliate; leaves membranous, long-petioled, ovate, acuminate, cordate at base, crenate, hispid, up to 3 in. long, 1·5 in. broad; capsules hispid. ..... 4. *brachystachya.*

Bracts campanulate, with many nerves ending in long subulate hispid teeth; leaves membranous, long-petioled, ovate, cuspidate-acuminate, rounded or cuneate at base, serrate, glandular, up to 3·5 in. long, 1·5 in. broad; capsules glabrous

5. *ciliata.*

Bracts folded, shortly toothed, the teeth with gland-tipped hairs, otherwise glabrous; leaves ovate or lanceolate, acute, crenate-serrate, hispid, up to 1·5 in. long, ·75 in. broad; capsules hispid ..... 6. *malabarica.*

Bracts small, shorter than the capsules, ·5 in. long, dentate, hispid; spikes elongate, more than 1 in. long; leaves membranous, long-petioled, ovate or lanceolate, acute, cuneate at base, crenate-serrate, up to 2·5 in. long and nearly as broad, but usually smaller; capsules hispid with glandular-based hairs ..... 7. *lanceolata.*

Flowers of ♀ few, sessile at the base of slender many-flowered ♂ spikes about 1 in. long; bracts folded, cuneate, villous and glandular, ·15 in. long; leaves ovate, obtusely acuminate or acute, cuneate at base, crenate, glabrous, glandular beneath, up to 3 in. long, 1·5 in. broad; capsules tomentose with large yellow glands in the sinuses. 8. *fruticosa.*

1. ACALYPHA PANICULATA, Miq ; F. B. I. v. 415.

   Carnatic, hills of S. Arcot; W. Ghâts, in all Districts from the Wynaad southwards, in shady moist places up to 4,000 ft.

   A small branching undershrub.

2. ACALYPHA ALNIFOLIA, Klein *ex* Willd.; F. B. I. v. 415.

   Deccan and Carnatic, westwards to the E. slopes of the W. Ghâts, up to about 3,000 ft.

   A small shrub, the stems usually with long soft shining hairs, the stems and leaves sometimes grey-tomentose.

3. ACALYPHA INDICA, Linn.; F. B. I. v. 416; Wt. Ic. t. 877.

   All plains Districts and in the lower hills, a weed of gardens, roadsides and cultivated land.

   An erect annual herb. Vern. *Tam.* Kupamani.

4. ACALYPHA BRACHYSTACHYA, Hornem.; F. B. I. v. 416.

   W. Ghâts, Mysore, Nilgiris, Anamalais and Pulneys, usually above 3,000 ft. in shade of Shola forests.

   A slender flaccid annual herb, 1 ft. or little more in height.

5. ACALYPHA CILIATA, Forsk.; F. B. I. v. 417.

   Deccan, hills of Kurnool; W. Ghâts, in all Districts, in forest undergrowth, at 1,000–4,000 ft.

   An erect annual herb up to 2 ft. in height.

6. ACALYPHA MALABARICA, Muell. Arg.; F. B. I. v. 416.

   S. Canara and Mysore.

   A rather stout leafy annual herb, up to 1 ft. in height.

7. ACALYPHA LANCEOLATA, Willd. *A. fallax*, Muell. Arg.; F. B. I. v. 416.

N. Circars, Deccan and Carnatic to S. Travancore, on waste land and in fields.

An annual herb, reaching 18 in. in height, the stems often clothed with long silky deciduous hairs, the leaves variable in shape.

8. ACALYPHA FRUTICOSA, Forsk.; F. B. I. v. 415.

Deccan and Carnatic, West to the E. slopes of the W. Ghâts, in dry localities.

A strong-smelling shrub with many yellow waxy glands, much branching.

A. Wilkesiana, Muell. Arg., is a shrub from the Fiji Islands very commonly grown in gardens for its coloured highly ornamental leaves and flower-spikes.

41. Tragia, Linn.

Perennial herbs, usually climbing, hispid with stinging hairs. *Leaves* alternate, simple or palmately 3-lobed, serrate, 3–5-ribbed at the base; stipules prominent at first, early deciduous. *Flowers* monoecious in terminal or leaf-opposed androgynous racemes, the ♂ uppermost, the ♀ below and few. *Calyx* in ♂ globose or obovoid, valvately 3–5-partite; in ♀ of 6 imbricate, usually pinnatifid, lobes, enlarged, hardened, and spreading stellately in fruit. *Petals* 0. *Disk* 0. *Stamens* 1–3, rarely more, usually 3; filaments free or connate; anthers with contiguous parallel cells. *Ovary* 3-celled; ovule 1 in each cell; styles united in a column, spreading above. *Fruit* a capsule of 3 2-valved cocci; endocarp crustaceous. *Seeds* globose; testa crustaceous; albumen fleshy; cotyledons broad, flat.

Leaves simple :—

Leaves not cordate at base, acute in uppermost or younger, rounded in lower or older ones, the large ones broadly ovate, abruptly acuminate, coarsely serrate, up to 4 in. long, 3 in. broad, longer and much narrower in the var.; fruiting calyx-lobes with narrow glabrous midrib and 4–6 pairs of short hispid teeth. . . . 1. *involucrata.*

Leaves cordate at base :—

Fruiting calyx-lobes oblong with 4–8 pairs of teeth, long and stiffly strigose :—

Upper branchlets and leaves densely fulvous-tomentose, the leaves (at any rate young ones) pale on the lower surface; lower leaves ovate-cordate, acuminate, regularly serrate, up to 5 in. long, 3 in. broad; midrib of fruiting calyx-lobes hispid within, teeth fulvous-hispid.....2. *bicolor.*

Upper branchlets and leaves sparsely greyish hispid; lower leaves broadly ovate-cordate, membranous, nearly glabrous, serrate, up to 5 in. long, 3 in. broad; midrib of fruiting calyx-lobes glabrous within, the teeth slender, white-hispid 3. *hispida.*

Fruiting calyx-lobes broadly ovate with many small teeth, glabrous on the middle of both sides, densely white-strigose on the margins; leaves membranous, green, nearly glabrous, broadly ovate-cordate, acuminate, coarsely serrate, up to 6 in. long, 4 in. broad.....4. *Muelleriana.*

Leaves palmately 3-partite, the middle lobe the longest and sometimes alone, the lobes pinnatifid, hispid and grey, about 3 in. long; fruiting calyx-lobes rather narrow, with 8–10 straight teeth, sparsely white-strigose .....5. *cannabina.*

1. TRAGIA INVOLUCRATA, Linn.; F. B. I. v. 465.

N. Circars, Deccan and Carnatic to S. Travancore.

An evergreen climbing hispid herb with stinging bristles, variable in foliage, the leaves rather thick. Vern. *Hind.* Barhanta.

Var. *angustifolia*, Hook. f. Leaves long and narrow, up to 6 in. long, ·5–·75 in. broad; fruiting calyx-lobes with very short teeth.

Hills of N. Coimbatore at 4,000 ft. (Fischer); Pulney Hills (Bourne, van Malderen).

2. TRAGIA BICOLOR, Miq.; F. B. I. v. 465.

W. Ghâts, Nilgiri and Pulney Hills, at 5,000–6,000 ft., in Shola forests.

A slender climbing stinging herb, hispid below, bright golden-tomentose on the innovations.

3. TRAGIA HISPIDA, Willd. *T. involucrata*, Linn.; F. B. I. v. 465 *in part.*

W. Coast, S. Canara and Malabar.

A slender climbing stinging herb.

4. TRAGIA MUELLERIANA, Pax and K. Hoffm. *T. involucrata*, Linn., var. *cordata*, Mnell. Arg.; F. B. I. v. 465.

W. Ghâts, Wynaad to the hills of Cochin. at 3,000–5,000 ft. in evergreen forest.

A slender stinging climbing herb.

5. TRAGIA CANNABINA, Linn. f. *T. involucrata* var. *cannabina*, Muell. Arg.; F. B. I. v. 465.

N. Circars, Deccan and Carnatic, in hedges and on waste lands.

A hispid erect or climbing shrub with stinging hairs, the leaves variable, sometimes not tripartite, sometimes with long narrow lobes.

42. Homonoia, Lour.

Rigid shrubs. *Leaves* alternate, glandular-scaly beneath; stipules slender, deciduous. *Flowers* dioecious, in axillary or lateral spikes, bract 1, bracteoles 2. *Calyx* in ♂ globose in bud, splitting valvately in 3 lobes; in ♀ of 5–8 small imbricate caducous lobes. *Petals* 0. *Disk* 0. *Stamens* very numerous, in a dense globose cluster of repeatedly branching filaments; anthers with 2 subglobose divaricate cells. *Ovary* 3-celled; ovule 1 in each cell; styles 3 spreading and very papillose. *Fruit* a capsule of 3 2-valved cocci. *Seeds* ovoid; testa crustaceous with an outer fleshy coat; albumen fleshy; cotyledons flat.

Leaves linear or linear-oblong, acute or rarely obtuse, entire or more or less serrulate towards the apex, glabrous above, very glandular-scaly beneath, up to 7 in. long, ·5 in. broad; spikes in both ♂ and ♀ elongate ..... 1. *riparia*.

Leaves obovate or oblanceolate, emarginate, cuneate at base, serrate-dentate, glabrous above, sparsely glandular-scaly beneath, 1–1·5 in. long, ·5–·7 in. broad; spikes in both ♂ and ♀ short ..... 2. *retusa*.

1. HOMONOIA RIPARIA, Lour.; F. B. I. v. 455. *Adelia neriifolia*, Roth.; Wt. Ic. t. 1868.

All Districts, at lower levels, in the beds of rivers and streams, especially among rocks.

An evergreen shrub. Bark brown; wood grey or greyish-brown, moderately hard, close-grained. Vern. *Tel.* Taniki; *Mal.* Kat-allári.

2. HOMONOIA RETUSA, Muell. Arg.; F. B. I. v. 456. *Adelia retusa*, Wt. Ic.

N. Circars from the Godavari southwards; Deccan and Carnatic in places, in river beds, not common.
A small shrub.

43. Lasiococca, Hook. f.

Small trees. *Leaves* alternate opposite or subverticillate, entire, penninerved, eglandular, shortly petioled; stipules deciduous. *Flowers* monoecious or dioecious, ♂ in racemes, ♀ solitary, axillary or lateral; bracts small. *Calyx* of ♂ flower globose, splitting valvately in 3 lobes; of ♀ of 5–7 unequal lobes, persistent and accrescent in fruit. *Petals* 0. *Disk* 0. *Stamens* numerous, in a much-branched column of filaments; anthers many, cells globose, divaricate with arching connectives. *Ovary* 3-celled; ovule 1 in each cell; styles 3, filiform, erect, with papillose stigmatic surfaces. *Fruit* a capsule of 3 cocci, deciduous from a 3-cornered columella, covered with bristles or conical tubercles. *Seeds* subglobose, smooth; testa crustaceous; albumen fleshy; cotyledons thin, subcordate.

Lasiococca Comberi, Haines in Kew Bull. 1920, 70.

N. Circars, hills of Vizagapatam, at 3,000–4,000 ft. (A. W. Lushington).

A small tree with obovate, or somewhat panduriform leaves obtusely abruptly acuminate at apex, narrowed and then cordate at base, up to 6 in. long, 2 in. broad. The ♀ flowers are long-peduncled and the capsules covered with conical tubercles ending in a hair.

44. Ricinus, Linn.

A tall glabrous glaucous annual shrub. *Leaves* alternate, palmately lobed with 7 or more serrate lobes. *Flowers* monoecious, in terminal paniculate racemes, the upper ♂, crowded, the lower ♀. *Calyx* in ♂ membranous, splitting into 3–5 valvate lobes; in ♀ spathaceous, caducous. *Petals* 0. *Disk* 0. *Stamens* very many, the filaments connate and repeatedly branched; anthers with distinct distant subglobose divergent cells. *Ovary* 3-celled; ovule 1 in each cell; styles entire 2-fid or 2-partite, papillose. *Fruit* a capsule of 3 2-valved cocci, prickly without. *Seeds* oblong; testa crustaceous, marbled; albumen fleshy; cotyledons broad.

RICINUS COMMUNIS, Linn.; F. B. I. v. 457.

Cultivated and found run wild in the fields and gardens, by roadsides and on waste land. Castor-oil plant.

Often almost a small tree with a thin greyish-brown bark and soft white wood. It is cultivated for the oil which is expressed from the seeds and used for burning, as a lubricant and in medicine. Vern. *Hind.* Arend; *Tam.* Sittamunuk; *Tel.* Amadam; *Kan.* Haralu.

45. Dalechampia, Linn.

Shrubs or undershrubs, often climbing. *Leaves* alternate, entire or 3–5-lobed or foliolate. *Flowers* monoecious, in dense axillary peduncled heads, with a pair of large leafy usually coloured bracts; ♂ central with an involucel of smaller bracts and sometimes processes representing sterile flowers; ♀ lateral and basal also with an involucel of smaller bracts. *Calyx* in ♂ globose splitting into 4–6 valvate lobes; in ♀ of 5–12 fimbriate or lacerate imbricate lobes. *Petals* 0. *Disk* 0. *Stamens* many, 20–30, the filaments connate below in a column inserted on the convex receptacle; anthers with parallel cells. *Ovary* 3–4-celled; ovule 1 in each cell; styles connate in a stout thickened column with a terminal entire or slightly lobed stigma. *Fruit* a deeply lobed capsule splitting into 3–4 2-valved cocci, the valves hard. *Seeds* globose, not caruncled; testa crustaceous; albumen fleshy; cotyledons broad, flat.

Leaves 3-foliolate, the leaflets sessile or very shortly petiolulate, the 2 lower with rounded and often lobed blades enlarged below, the mid-lobe ovate, acuminate, 2–3 in. long, all glabrous; outer bracts 3-lobed, about 1 in. long, inner also lobed; calyx of ♂ of 4 entire lobes, of ♀ of 8–12 nearly linear lobes with stalked marginal glands; anthers not apiculate ..... 1. *indica.*

Leaves 3-lobed, the 2 lower enlarged below, the midlobe ovate, acute, up to 4 in. long, all tomentose; outer bracts 3-fid, about 1·5 in. long, inner entire: calyx of ♂ of 6 entire lobes, of ♀ of 8–10 pinnatifid long strigose lobes: anthers apiculate ..... 2. *velutina.*

1. DALECHAMPIA INDICA, Wt. Ic. t. 1882; F. B. I. v. 467.

Carnatic, from the Nellore Veligondas (Heyne) and the Kambakam Hills of Chingleput (Rangachari) southwards and westwards to the E. slopes of the W. Ghats.

A slender twining undershrub with large yellow involucral bracts and slender short fruiting calyx, very glandular.

2. DALECHAMPIA VELUTINA, Wt. Ic. t. 1881; F. B. I. v. 467.

W. Ghâts, Nilgiri Hills, above 5,000 ft. (Wight, King, Bidie, Fischer).

A slender twining undershrub with large bracts and conspicuously strigose fruiting calyx.

46. Ostodes, Blume.

Trees or shrubs. *Leaves* alternate, entire or serrate, usually penninerved, stipular. *Flowers* dioecious or monoecious, in lax terminal and lateral panicled usually pendulous racemes, ♂ in fascicles, ♀ in separate racemes or solitary in ♂ ones. *Calyx* of 5 broad unequal imbricate lobes. *Petals* 5–6, larger, longer than calyx-lobes. *Disk* of 5 glands or annular. *Stamens* numerous, on a convex or columnar receptacle; filaments free; anthers dorsifixed, connective broad. *Ovary* 3-celled; ovule 1 in each cell; styles short, 2-cleft. *Fruit* a large subglobose 6-ribbed capsule, the exocarp separable from the hard endocarp, breaking up into 3 2-valved cocci. *Seeds* ovoid; testa crustaceous with a fleshy outer layer; albumen fleshy; cotyledons broad, flat.

OSTODES ZEYLANICUS, Muell. Arg.; F. B. I. v. 400; Bedd. Fl. t. 274.

W. Ghâts, Wynaad, Anamalais, Atapadi Hills of Malabar and hills of Travancore, up to 3,000 ft.

A large tree with large long-petioled oblong or oblanceolate distantly serrate leaves, up to 12 in. long, 4 in. broad. Wood white, soft and perishable.

Var. *minor*, Thw. Leaves smaller, up to 7 in. long, fewer-nerved and nearly entire, the racemes shorter, the capsule smaller and tomentose.

W. Ghâts, Wynaad (Lawson) to Travancore.

47. Dimorphocalyx, Thw.

Glabrous trees. *Leaves* alternate, entire, penninerved, stipulate. *Flowers* dioecious, ♂ usually in axillary cymes or racemes or solitary, ♀ solitary or 2–3 together and terminal or leaf-opposed. *Calyx* in ♂ cup-shaped with 5 small lobes; in ♀

large, of 5 oblong obtuse imbricate lobes, enlarged and spreading in fruit. *Petals* 5, erect, imbricate. *Disk* in ♂ of glands, in ♀ annular. *Stamens* 10–20, usually in 2 rows, on a short column; filaments thick; anthers dorsifixed, the cells adnate to the thick connective, parallel or divergent. *Ovary* 3-celled; ovule 1 in each cell; styles 3, connate at the base, bifid. *Fruit* a capsule of 3 2-valved crustaceous cocci surrounded at the base by the persistent calyx-lobes. *Seeds* ovoid; testa crustaceous; albumen fleshy; cotyledons flat.

Fruiting calyx obovate, obtuse, ·25–·5 in. long, with a glandular pit on back near the tip; leaves elliptic or lanceolate, obtuse or acute, up to about 5 in. long, 2 in. broad; capsule ·5 in. long, slightly hispid-villous, shortly lobed ..... 1. *glabellus.*
Fruiting calyx elliptic-oblong or lanceolate, emarginate, ·5–1 in. long, the lobes unequal; leaves elliptic-oblong or lanceolate, usually long-, but obtusely-acuminate, up to 7 in. long, 2·5 in. broad; capsule ·5–·7 in. long, villous, scarcely lobed ..... 2. *Lawianus.*

1. DIMORPHOCALYX GLABELLUS, Thw.; F. B. I. v. 403; Trimen Fl. Ceyl. t. 84.

   N. Circars, coast scrub near the sea, Vizagapatam (W. Elliot, Gamble); W Ghâts, Anamalais and hills of Tinnevelly.

   A small much-branched tree, the leaves reddish brown when dry and rather thin, the branchlets nearly white.

2. DIMORPHOCALYX LAWIANUS, Hook. f.; F. B. I. v. 404; *Trigonostemon Lawianus*, Bedd. Fl. t. 273.

   W. Ghâts, in all Districts, western side, in evergreen forests, up to 4,000 ft.

   A small or moderate-sized tree with nearly white branchlets. Wood white, hard, close-grained.

48. Blachia, Baill.

Glabrous shrubs or small trees. *Leaves* alternate or subopposite, petioled, entire, penninerved. *Flowers* monoecious or subdioecious, ♂ terminal, umbellate or racemose, on filiform pedicels, ♀ solitary or fascicled, on thickened pedicels. *Sepals* in ♂ 4–5, membranous, concave, imbricate; in ♀ lanceolate or oblong, in fruit sometimes accrescent, sometimes caducous. *Petals* in ♂ 4–5, small, rounded, hyaline; in ♀ 0. *Disk* in ♂ of scale-like glands alternating with the petals; in ♀ annular.

Stamens **10–20, on a convex receptacle; filaments free; anther-cells on the margin of the connective, at length confluent.** ***Ovary*** **3–4-celled; ovule 1 in each cell; styles distinct, filiform, 2-partite.** ***Fruit*** **a capsule of 3 2-valved cocci.** ***Seeds*** **oblong, estrophiolate; testa crustaceous, often mottled, shining; albumen fleshy; cotyledons broad, flat.**

Flowers of ♂ in umbels :—

Calyx of ♀ scarcely enlarged in fruit, the lobes reflexed; leaves ovate or obovate, obtuse or cuspidate-acuminate, up to 3 in. long, 1·5 in. broad; capsule ·4 in. long, not deeply lobed, smooth 1. *reflexa.*

Calyx of ♀ enlarged in fruit, the lobes erect; leaves ovate or obovate, acuminate, narrowed at base, up to 7 in. long, 3 in. broad; capsule ·6 in. long, deeply lobed ..... 2. *umbellata.*

Flowers of ♂ in racemes :—

Calyx of ♀ enlarged in fruit, the lobes spreading, leaves lanceolate or elliptic-rhomboid, acuminate, cuneate at base, up to 5 in. long, 2 in. broad; capsule ·4 in. long, with shallow lobes .... 3. *calycina.*

Calyx of ♀ deciduous after flowering; leaves oblong-lanceolate or -ovate, unequal-sided, up to 5 in. long, 2 in. broad; capsule ·3–·5 in. long, prominently lobed ..... 4. *denudata.*

1. BLACHIA REFLEXA, Benth.; F. B. I. v. 402.
   W. Ghâts—"Nilgiris and Coorg" (G. Thomson), Travancore (Bourdillon) in evergreen forests, about 1,000 ft.
   A shrub.
2. BLACHIA UMBELLATA, Baill.; F. B. I. v. 402.
   W. Ghâts, Coorg, Wynaad and hills of Travancore and Tinnevelly, in evergreen forests, at 1,000–3,000 ft.
   A shrub or small tree.
3. BLACHIA CALYCINA, Benth.; F. B. I. v. 402. *Croton umbellatum*, Wt. Ic. t. 1874.
   W. Ghâts, hills of Travancore and Tinnevelly, in evergreen forests, at 1,000–2,000 ft.
   A shrub.
4. BLACHIA DENUDATA, Benth.; F. B. I. v. 403.
   W. Ghâts, S. Canara (Beddome); Bababudan Hills of Mysore (Law).
   A shrub or small tree, the specimens probably right but a little uncertain, as the leaves are so variable.

49. Jatropha, Linn.

Herbs, shrubs or trees, often glandular or prickly. *Leaves* alternate, entire or palmately-lobed or -partite; stipules often ciliate. *Flowers* monoecious, in terminal cymes; the central flowers of the cyme or its forks usually ♀. *Calyx* of 5 often coloured imbricate lobes. *Petals* 5, contorted, free or connate, sometimes absent in ♀. *Disk* entire or of 5 glands. *Stamens* numerous; filaments connate or those of the outer series free; anthers erect, ovate or oblong, the cells parallel, contiguous. *Ovary* 2–4-celled; ovule solitary in each cell; styles connate below, 2-fid above, the lobes entire or again bifid. *Fruit* a capsule of 2–4 2-valved cocci; endocarp crustaceous or bony. *Seeds* ovoid or oblong; testa crustaceous; albumen fleshy; cotyledons broad, flat.

Petals free or nearly so :—

Leaves without glands, 3-lobed to below the middle, sometimes simple, sometimes 5-lobed, the lobes long and narrow, the base cuneate, length up to 8 in., stipules capillary; capsule ·5–·7 in. long, often pustulate ..... 1. *heterophylla.*

Leaves glandular, palmately 3–5-lobed to below the middle :—

Leaves serrate, each tooth ending in a gland-tipped bristle, lobes obovate, shortly acuminate; stipules very long with many filiform glandular-tipped divisions; capsule ·4–·5 in. long, rugose ..... 2. *glandulifera.*

Leaves entire, the margins with a close row of shortly stipitate viscid glands which occur, though longer and branched, on the petioles and short stipules, lobes obovate, shortly acute; capsule ·4 in. long, reticulate-rugose ..... 3. *gossypifolia.*

Petals connate to the middle or above it :—

Glabrous, the leaves not peltate, orbicular-cordate, entire or 3–5-lobed or -angled, up to 6 in. in diam.; capsule subglobose or ellipsoid, about 1 in. long, rugose ..... 4. *Curcas.*

Branchlets and leaves beneath fulvous-tomentose, the leaves peltate, suborbicular, obtusely 5–7-lobed, up to about 6 in. in diam.; capsule globosely oblong, up to 1 in. long ..... 5. *Wightiana.*

1. JATROPHA HETEROPHYLLA, Heyne; F. B. I. v. 382.

Deccan, from Nellore and Cuddapah westwards to Coimbatore and the N. side of Nilgiris, on dry stony ground.

A small low glabrous shrub branching from a tuberous rootstock, the flowers greenish.

2. JATROPHA GLANDULIFERA, Roxb.; F. B. I. v. 382.
Deccan and Carnatic, from the Kistna river southwards, often on black cotton soil.
A shrub with stout thick branches with a smooth papery pale bark, the flowers greenish yellow.

3. JATROPHA GOSSYPIFOLIA, Linn.; F. B. I. v. 383.
All plains Districts, on roadsides and in waste places, a common weed, introduced from Brazil, and quite naturalized.
A small dark-coloured shrub with soft wood and reddish flowers. Vern. *Tam.* Atalai; *Tel.* Nela-amida.

4. JATROPHA CURCAS, Linn.; F. B. I. v. 383.
All plains Districts, about villages and in hedges, an American plant, cultivated and naturalized. Physic Nut.
A shrub or small tree with yellowish-green flowers. Bark greenish white, smooth, peeling off in thin flakes; wood white, very soft. The seeds give a medicinal oil. Vern. *Hind.* Bagherenda; *Tel.* Nepalam; *Tam.* Kaat-amunak.

5. JATROPHA WIGHTIANA, Muell. Arg.; F. B. I. v. 383. *J. peltata*, Wt. Ic. t. 1169 (*J. villosa* in text).
W. Deccan, Mysore and Coimbatore, in dry stony scrub.
A low branching shrub with pale yellowish flowers.
J. multifida, Linn., the Coral Plant, is a glabrous shrub, native of America, which is commonly cultivated in gardens. It has handsome leaves of orbicular outline very much cut palmately into narrow lobes, while the peduncles and flowers are bright red. Some other species of the genus are also occasionally found in gardens in cultivation.

50. Tritaxis, Baill.

Trees or shrubs. *Leaves* alternate, entire or toothed, penni-nerved. *Flowers* usually monoecious in terminal dichotomous cymes, the central flower of each cyme subsessile ♀, surrounded by many ♂ pedicelled. *Calyx* 5-lobed. *Petals* 5, longer than the calyx-lobes. *Disk* of 5 glands. *Stamens* in 2–3 whorls, the inner or all forming a central column; anthers of the outer whorl erect, of the inner horizontal, the cells parallel, introrse. *Ovary* 3-celled; ovule 1 in each cell; styles 2-fid. *Fruit* a capsule of 3 2-valved cocci.

TRITAXIS BEDDOMEI, Benth.; F. B. I. v. 384.

W. Ghâts, hills of Tinnevelly and Travancore (Beddome).

A small tree with slender terete branches, thinly coriaceous leaves reaching 4 in. in length, and terminal branching cymes.

51. Trigonostemon, Blume.

Evergreen trees or shrubs. *Leaves* alternate, penninerved. *Flowers* monoecious, in axillary or terminal spikes, racemes or cymes. *Calyx* of 5 imbricate lobes. *Petals* 5, sometimes 0 in ♀. *Disk* of 5 glands, often united in a lobed cup. *Stamens* 3 or 5, connate in a short column with free spreading tips; anthers erect or horizontal, the cells united by their bases. *Ovary* 3-celled; ovule 1 in each cell; styles bifid or twice bifid, rarely entire. *Fruit* a capsule of 3 2-valved cocci. *Seeds* ovoid or globose; testa crustaceous, mottled; albumen fleshy; cotyledons broad, flat.

TRIGONOSTEMON NEMORALIS, Thw.; F. B. I. v. 398; Bedd. Ic. t. 182.

W. Ghâts, Wynaad (Beddome), hills of Tinnevelly, in evergreen forests, at 2,000–3,000 ft., often on river banks.

A shrub or small tree with elliptic-oblong or -lanceolate sinuate-lobed leaves reaching 6 in. long, the young parts and inflorescence strigose-hairy, the flowers red.

52. Givotia, Griff.

A tree, conspicuously softly white-stellate-tomentose on branchlets, inflorescence and undersurface of leaves. *Leaves* alternate, broadly ovate or orbicular, cordate, coarsely dentate, palmately ribbed, long-petioled. *Flowers* dioecious, in axillary or subterminal racemose or paniculate cymes; pedicels jointed; bracts linear, conspicuous. *Calyx* of 5 oblong imbricate lobes. *Petals* 5, longer than the calyx-lobes, cohering in a campanulate corolla. *Disk* of ♂ of orbicular glands, of ♀ cupular. *Stamens* 13–25, on a villous receptacle; filaments erect, connate below; anthers ovate, dorsifixed, the cells parallel. *Ovary* 2–3-celled; ovule 1 in each cell; styles short, spreading, 2-fid. *Fruit* a subglobose drupe, 1-seeded. *Seed* globose or ellipsoid; testa bony; albumen fleshy; cotyledons flat.

GIVOTIA ROTTLERIFORMIS, Griff.; F. B. I. v. 395; Wt. Ic. t. 1889; Bedd. Fl. t. 285.

Deccan, hilly country in Hyderabad and the Ceded Districts to Coimbatore; hills of the Carnatic to S. Travancore; E. slopes of W. Ghats, in dry deciduous forests chiefly.

A moderate-sized tree conspicuous for its large leaves densely white-tomentose beneath reaching a diameter of up to 10 in. The flower-panicles are usually more fulvous-tomentose, with distant clusters, the drupe 1 in. long. Bark brown, smooth, peeling off in circular scales; wood white, very light and soft, used for carved images, toys, lacquered articles and catamarans. The seeds give an oil. Vern. *Tel.* Tella puliki; *Tam.* Vendalai.

53. Baliospermum, Blume.

Erect shrubs or undershrubs. *Leaves* alternate, minutely lobed, palminerved or penninerved, biglandular at base. *Flowers* small, monoecious or dioecious, in fascicles, panicles or racemes. *Calyx* in ♂ globose, opening in 4–5 membranous concave imbricate lobes; in ♀ of 5–6 lanceolate entire or toothed lobes sometimes accrescent in fruit. *Petals* 0. *Disk* in ♂ of 4–6 glands, in ♀ annular. *Stamens* numerous, 10–30, on a central receptacle; filaments slender, free; anthers terminal, the cells adnate to the broad connective. *Ovary* 3-celled; ovule 1 in each cell; styles stout, 2-fid or 2-partite with smooth stigmatic surfaces. *Fruit* a capsule of 3 2-valved crustaceous cocci. *Seeds* ovoid, caruncled; testa crustaceous; albumen fleshy; cotyledons flat.

BALIOSPERMUM MONTANUM, Muell. Arg. *B. axillare*, Blume; F. B. I. v. 461. *B. polyandrum*, Wt. Ic. t. 1885.

N. Circars, Deccan and W. Coast, in shady places, at low levels.

A stout leafy undershrub from 3–6 ft. high with leaves very variable in shape and size, the large ones ovate oblong or rounded, often 12 in. long and long-petioled, the small upper ones lanceolate. The seeds give a medicinal oil. Vern. *Hind.* Danti.

54. Gelonium, Roxb.

Evergreen glabrous trees or shrubs, the branches with stipular lines at the nodes. *Leaves* alternate or sometimes opposite,

pellucid-punctate, entire or serrate; stipules connate, sheathing, caducous. *Flowers* small, dioecious, in axillary cymes or clusters. *Calyx* in ♂ of 5 concave orbicular imbricate lobes, in ♀ of 5–6 narrower lobes. *Petals* 0. *Disk* in ♂ 0, in ♀ cupular, the glands large, peripheric. *Stamens* 10–60, free, central on a convex receptacle, often mixed with rugose glands; filaments filiform; anthers oblong, dorsifixed, the cells parallel. *Ovary* 2–4-celled; ovule 1 in each cell; styles minute, reniform semilunate or bifid, depressed. *Fruit* a globose or obscurely lobed usually fleshy or crustaceous capsule. *Seeds* subglobose, arillate; testa crustaceous; albumen fleshy; cotyledons flat.

Flowers rather large, many, in cymes or clusters; leaves elliptic or elliptic-oblong, acute, up to 7 in. long; capsule rough, obscurely lobed, ·5–·75 in. in diam. ..... 1. *multiflorum*
Flowers small, rather few, in fascicles; leaves obovate or oblanceolate, obtuse, up to 4 in. long, but usually less; capsules smooth, deeply lobed, keeled on the lobes, ·3–·4 in. in diam. ..... 2. *lanceolatum*.

1. GELONIUM MULTIFLORUM, A. Juss.; F. B. I. v. 459.
   N. Circars, in evergreen forests and shady places; Travancore, but perhaps cultivated.
   A small evergreen tree with coriaceous shining leaves. Bark grey, wood yellowish-white, close-grained. Vern. *Ur.* Khakra.
2. GELONIUM LANCEOLATUM, Willd.; F. B. I. v. 459; Wt. Ic. t. 1867.
   N. Circars and Deccan, in hilly country; W. Ghâts, Cochin and Travancore, at low levels, in evergreen forest.
   A small evergreen tree with shining pale coriaceous leaves Vern. *Tel.* Suragada; *Tam.* Kakaipalai.

55. Sebastiania, Spreng.

Herbs or shrubs. *Leaves* alternate, penninerved. *Flowers* minute, monoecious, in slender racemes, the ♂ 1–3 to each bract, the ♀ solitary or at the base of the raceme. *Calyx* of ♂ minute, membranous, unequally 5-lobed or -partite, of ♀ 3-lobed or -partite. *Petals* 0. *Disk* 0. *Stamens* 2–4; filaments short, free or nearly so; anther-cells distinct, contiguous, parallel. *Ovary* 3-celled; ovule 1 in each cell; styles free or connate at base,

entire, revolute or spreading. *Fruit* a capsule of 3 cocci separating from a columella. *Seeds* oblong or subglobose, carunculate; testa smooth, albumen fleshy; cotyledons flat.

SEBASTIANIA CHAMAELEA, Muell. Arg.; F. B. I. v. 475.

All plains Districts, a weed of cultivated land, and forest undergrowth.

A glabrous annual herb with linear leaves up to 3 in. long and a capsule with two rows of spines on the cocci.

56. Excoecaria, Linn.

Glabrous trees or shrubs with acrid milky juice. *Leaves* alternate or opposite, entire or subserrate. *Flowers* monoecious or dioecious, very small, in bracteate spikes or racemes, the ♂ 1–3 to each bract, 2-bracteolate, the ♀ at the base or in separate inflorescences; rhachis with large glands beneath or at the sides of the bracts. *Calyx* in ♂ of 3 small subequal lobes, in ♀ 3-fid or -partite. *Petals* 0. *Disk* 0. *Stamens* 3, filaments free, anthers didymous, the cells parallel. *Ovary* 3-celled; ovule 1 in each cell; styles 3, stout, spreading or recurved. *Fruit* a capsule of 3 cocci separating from a columella, the valves crustaceous, twisting elastically. *Seeds* subglobose, not carunculate; testa crustaceous; albumen fleshy; cotyledons flat.

Leaves alternate, ovate-elliptic or orbicular, shortly acuminate, entire or sinuate-crenate, glabrous, up to 3 in. long, 2 in. broad; ♂ spikes very catkin-like, slender, up to 5 in. long, filaments long; capsule deeply lobed, ·3 in. in diam., smooth ..... 1. *Agollocha.*

Leaves opposite, serrate or crenulate; filaments short:—

Leaves chartaceous, lanceolate or oblanceolate, acuminate at both ends, up to 6 in. long, 1·5 in. broad, main nerves regular, 10–16 pairs; ♂ spikes slender, about 2 in. long, the bracteoles subulate; capsule deeply lobed, ·5 in. in diam. ..... 2. *crenulata.*

Leaves coriaceous, linear-oblong to oblong-lanceolate or -oblanceolate, abruptly acuminate, up to 10 in. long, 3 in. broad, main nerves regular, 15–20 pairs; ♂ spikes stout, 2–6 in. long, the bracteoles broadly ovate; capsules shallowly lobed, up to 1 in. in diam. ..... 3. *robusta.*

1. EXCOECARIA AGALLOCHA, Linn.; F. B. I. v. 472; Wt. Ic. t. 1865 B.

Tidal forests and swamps on both coasts.

An evergreen tree with a poisonous milky juice. Bark grey, smooth, shining, with prominent lenticels; wood white, very soft, but apparently little used. Vern. *Hind.* Gangwa; *Tel.* Thilla; *Tam.* Tilai; *Mal.* Komatti.

2. EXCOECARIA CRENULATA, Wt. Ic. t. 1865; F. B. I. v. 473.
W. Ghâts, Nilgiris, Anamalais and hills of Travancore and Tinnevelly, in Shola forests above 5,000 ft.
A small evergreen tree or shrub.

3. EXCOECARIA ROBUSTA, Hook. f.; F. B. I. v. 474.
W. Ghâts, Coorg, Nilgiris, Anamalais and hills of Travancore and Tinnevelly; Kollimalai Hills of Trichinopoly; in evergreen forests at 2,000–5,000 ft.
A shrub with stout branches.

E. bicolor, Hassk., is a pretty shrub, common in gardens, having the under-surface of the leaves red.

57. Sapium, P. Br.

Trees or shrubs with milky juice. *Leaves* alternate, entire or toothed, penninerved; petiole often 2-glandular at top. *Flowers* monoecious, in terminal, simple or panicled, spikes or racemes; ♂ several to each bract, ♀ solitary, lower down or separate. *Petals* 0. *Disk* 0. *Stamens* 2–3; filaments free; anther-cells distinct, parallel. *Ovary* 2–3-celled; ovule 1 in each cell; styles free or connate at the base, spreading or recurved. *Fruit* a crustaceous fleshy or pulpy rarely woody capsule, at length loculicidally 3-valved. *Seeds* globose, not carunculate, usually long-persistent on the columella; testa crustaceous; albumen fleshy; cotyledons flat.

Evergreen; ♂ and ♀ flowers on the same spike, the ♀ lowest, the styles long and slender; leaves lanceolate, acuminate, crenate-serrate, 3–5 in. long, 1–1·5 in. broad, main nerves very many and parallel; capsule large, depressed globose, 1–1·25 in. in diam., shining, very hard and woody ..... 1. *indicum.*

Deciduous; ♂ and ♀ flowers on separate spikes, the styles very short; leaves crowded at the ends of the branchlets, elliptic-ovate or obovate, acute, attenuate at base, crenate-serrate, 6–9 in. long, 3 in. broad, main nerves 12–20 pairs; capsule fleshy, ·3 in. in diam., ovoid 2. *insigne.*

1. SAPIUM INDICUM, Willd.; F. B. I. v. 471; Wt. Ic. t. 1950.
   West Coast, along backwaters in Malabar and Travancore. A small tree with acrid milky juice. Bark smooth, grey; wood white with small brown heartwood.
2. SAPIUM INSIGNE, Benth.; F. B. I. v. 471. *Falconeria malabarica*, Wt. Ic. t. 1866.
   Deccan, hills of Kurnool, Cuddapah and Nellore, Kambakam Hill in Chingleput, W. Ghâts and W. Coast, usually in rocky places, up to 6,000 ft.
   A deciduous tree, usually small, but sometimes of a fair size, the branchlets thick and fleshy, the juice acrid and poisonous. Bark grey, smooth, shining; wood white or grey, soft and spongy. Vern. *Hind.* Lendwa.

S. sebiferum, Roxb., is the Chinese Tallow tree, occasionally found in cultivation. It is the white wax round the seeds that can be used for candles.

Pedilanthus tithymaloides, Poit, is a fleshy American shrub with red or orange flowers, often found in gardens or planted as a hedge plant. *Cicca disticha*, Linn., is the Star Gooseberry, a small tree allied to *Emblica*, whose fruits are cooked and eaten or made into preserves. The chief tree grown in plantations to produce india-rubber is *Hevea braziliensis*, the Pará rubber tree of Brazil, while the less cultivated Ceará rubber is given by *Manihot Glaziovii*, Muell. Arg.

Manihot utilissima, Pohl, is the Cassava plant, occasionally cultivated for its tubers, which are edible, and from which also the starch known as Tapioca is prepared.

The common garden shrubs with curiously shaped and variegated leaves known as "Crotons," are species of the genus *Codiaeum*, especially *C. variegatum*, Linn., from the islands of the Pacific.