

FLORA
OF THE
PRESIDENCY OF MADRAS

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PART IV
RUBIACEAE TO EBENACEAE.

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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.

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FLORA OF MADRAS.

Family LXXXIII. RUBIACEAE.

Trees shrubs or herbs, erect prostrate or climbing. *Leaves* opposite or whorled, entire; stipules various, inter- or intrapetiolar, 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 fusiform1. **Nauclea.**

Calyx-tubes not fused into a fleshy mass:—

Corolla-lobes imbricate; flowers ebracteolate:—

Stigma fusiform; seeds not winged2. **Anthocephalus.**

Stigma globose; seeds winged3. **Neonauclea.**

Corolla-lobes valvate; flowers bracteolate:—

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

Stigma mitriform; calyx-limb truncate5. **Mitragnya.**

Climbing shrubs with peduncles sometimes transformed into hooks6. **Uncaria.**

Flowers not usually collected in dense globose heads:—

Fruit capsular, 2- rarely 4-celled:—

Corolla-lobes twisted in bud, imbricate7. **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 side9. **Dentella.**

Corolla-lobes entire :—

Anthers connivent, dehiscing by apical pores ; corolla rotate :—

Stigma 1, capitate ; small herbs with thin leaves and small stipules10. **Argostemma.**

Stigmas 2, capitate ; large herbs with large leaves and large, usually bifid stipules11. **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 pitted12. **Oldenlandia.**

Seeds few, plano-convex or globose with a ventral cavity13. **Anotis.**

Calyx-teeth 5 ; capsule obcordate, of 2 compressed lobes, loculicidal above the calyx14. **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 bisexual19. **Chomelia.**

Flowers dioecious20. **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. **Electronia.**

Ovary 3-5-celled..... 27. **Yangueria.**

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 toothed42. **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 dry45. **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*-tube 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 sub-panicled, 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. Gháts, 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 paniced globose peduncled heads, the receptacle with stiff hairs; bracts in pairs on the peduncle or 0; bractæoles 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. Gháts, 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 paniced, 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 paniced, 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 thyrsoïd or paniced 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, exerted. *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, linear7. *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. Gháts, hills of Travancore.

A small tree.

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

Deccan, forests of Cuddapah (Beddome); W. Gháts, hills of Tinnevely, 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. Gháts, 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. Gháts, 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 or

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. Gháts, 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; W. & A. 392; Wt. Ic. t. 1159; Bedd. Fl. t. 219.

W. Gháts, 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 punctulate.

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 acute1. *Courtallense*.

Flowers 5-merous, peduncles much shorter than the leaves; leaves lanceolate or ovate-lanceolate, acuminate2. *verticillatum*.

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

W. Gháts, 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. Gháts, 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. Gháts, 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 septically, 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 septically, 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 oblique5. *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 oblique6. *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. *eulata*.

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 nerves22. *Ramarowii*.

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 axillary 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 cup28. *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 paniced 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 exerted, 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 exerted; calyx-lobes small, lanceolate; leaves ovate or ovate-lanceolate, very small

38. *Prairieana*.

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 exerted; 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. Gháts 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. Gháts, at low levels from S. Canara southwards.

An annual usually prostrate herb with stiff leaves.

3. OLDENLANDIA TRINERVIA, Retz; F. B. I. iii. 66. *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. Gháts, 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. Gháts, hills of Travancore and Tinnevely.

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 Tinnevely (Wight).

7. OLDENLANDIA ARTICULARIS, Gamble n. comb. *Hedyotis articularis*, Br.; F. B. I. iii. 51; W. & A. 407; Wt. Ic. t. 1028.

W. Gháts, Sholas of the Nilgiris above 6,000 ft., less common in Anamalais, Pulneys and Palghát 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Anamalais and hills of Tinnevely 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Chembra 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. Gháts, hills of Tinnevely and Travancore at 3,000–4,000 ft.

A glabrous pale undershrub.

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

W. Gháts, hills of Travancore.

A bush reaching 4 ft. in height.

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

W. Gháts, 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. Gháts, 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. Gháts, Agastiamalai in Tinnevely 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. Gháts, 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. Gháts, hills of Travancore and Tinnevely 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. Gháts, hills of Tinnevely, 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 Tinnevely 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. Gháts 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 exerted. *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 exerted:—

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. *lanceifolia*.

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 dehiscent septically, 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. Gháts, 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. Gháts, 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. Gháts, Pulneys and hills of Travancore and Tinnevely.

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

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

W. Gháts, hills of Mysore.

5. *ANOTIS RHEEDII*, Benth. & Hook. f.; F. B. I. iii. 73.
W. Coast and W. Gháts, 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. Gháts, 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. Gháts, Bababudan Hills of Mysore at 6,000 ft.; hills of Travancore and Tinnevely, 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. Gháts, from Mysore and Canara (Law) to Malabar (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. Gháts, 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. Gháts, 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 2.5 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 pairs8. *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...*eriantha*.

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. Gháts, from Wynaad to the Anamalais and the hills of Travancore and Tinnevely, 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. Gháts, Bolampatti hills of Coimbatore, hills of Malabar, Tinnevely 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Aralagudem Ghát, 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. Gháts, Sivagiri and Naterikal hills of Tinnevely.

An erect undershrub with large flowers.

8. *OPHIORRHIZA ROXBURGHIANA*, Wt. Ic. t. 1068; F. B. I. iii. 81.

W. Gháts, 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. Gháts, at Courtallum in Tinnevely (Wight); Travancore, at Peermerd (Beddome).

An erect undershrub, the large flowers very villous.

10. *OPHIORRHIZA PECTINATA*, Arn.; F. B. I. iii. 81.

W. Gháts, in Malabar, Anamalais, Tinnevely 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 Ghát (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 hirsute3. *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 hirsute5. *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. Gháts, at Kannikatti, Tinnevely, 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. III. t. 124.

W. Gháts, in S. Canara, Malabar and the Tinnevely 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. Gháts, at low levels from S. Canara to Travancore, inland from Mysore to Tinnevely 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. *a*, 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. Gháts from Mysore through Nilgiris and Pulneys to Tinnevely 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. Gháts, hills of Tinnevely 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. Gháts, in the Anamalai and Tinnevely 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 paniced 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. Gháts, 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. *Axanthos ceylanica*, Wt. Ic. t. 1163.

W. Gháts, 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 Bababudan Hills, Nilgiris, Pulneys and Tinnevely 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. Tinnevely 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 reticulate3. *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. *Candolleana*.

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 ruminant 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 ELIGINOSA*, 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 Travancore; W. Gháts, 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 sub-terminal 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. Gháts, 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. Gháts, 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. Gháts, from S. Canara and Coorg to the Nilgiris, Anamalais, Pulneys and the hills of Tinnevely 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 Tinnevely.

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 Gháts, 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. enneandra*, Koen.; F. B. I. iii. 119; W. & A. 395; Wt. Ic. t. 574.

N. Circars and Deccan, extending to the lower hills of the Gháts, 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. Gháts; Courtallum in Tinnevely (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. Gháts, 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. Gháts, 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. Gháts, in the hills of Tinnevely and Travancore, about 4,000-5,000 ft.

An erect herb nearly quite glabrous, from a woody rootstock.

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

Deccan, hills of Cuddapah, N. Arcot and Chingleput; W. Gháts, 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. Gháts, Mahendragiri Hill, Tinnevely (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, acuminate1. *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 rugose5. *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 Tinnevely (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. Gháts, Pulney Hills (*Bourne*) and Sivagiri Hills of Tinnevely (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. Gháts, Sholas of W. Nilgiris about Sispara; forests of the Travancore and Tinnevely 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. Gháts, 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. Gháts, in the Anamalais and hills of Travancore and Tinnevely.

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. Gháts 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. Gháts, 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. Gháts, from the Wynaad to the hills of Travancore and Tinnevely, 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.

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-lobes3. *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 filiform7. *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-horizontal12. *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 Tinnevely 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 Tinnevely 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, "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. Gháts, 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. Gháts, 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. Gháts, 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. long1. *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 puberulous3. *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 Tinnevely 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 Tinnevely, 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. Gháts, 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 Tinnevely, 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. Gháts, 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. Gháts, 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 glabrous3. *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. Gháts, about Courtallum in Tinnevely (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. Gháts, Shola forests of the Kundahs in Nilgiris, above 7,000 ft.; hills of Tinnevely 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. Gháts, evergreen forests from S. Canara to Tinnevely 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. Gháts, 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, subdidymous, '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 pointed; 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. Gháts. 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. Gháts, 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 Gháts, 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 ruminant or not; cotyledons leafy, small; radicle inferior.

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

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

Inflorescence globular-capitate, pedunculate; calyx-lobes broadly obovate ciliate; leaves oblong-oblancoate, 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. Gháts, hills of Courtallum in Tinnevely (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. Gháts, especially in the Anamalais and the hills of Travancore and Tinnevely, 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 Ghát 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. Gháts, 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. Gháts, 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. Gháts, hills of Tinnevely 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. Gháts, hills of Travancore and Tinnevely, about 2,000–4,000 ft.
A large shrub with pale branchlets.
9. *PSYCHOTRIA FLAVIDA*, Talbot Trees and Shrubs Bomb. ed. 1, 113.
W. Gháts, 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. Gháts, Pulney Hills and Sivagiri Hills of Tinnevely.
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. Gháts, Nilgiris, Anamalais, Pulneys and hills of Tinnevely 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. Gháts, hills of Travancore and Tinnevely, 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. Gháts, 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. Gháts, 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. Gháts.

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

16. *PSYCHOTRIA BARBERI*, Gamble in Kew Bull. 1920, 248.

W. Gháts, 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. Gháts, 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 in Wall. Coll. 8366).

E. Gháts, 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. Gháts, Maliyamadurgam, Coimbatore, 4,000 ft. (Fischer), Kotagiri Ghát 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. Gháts, hills of Vizagapatam at about 3,000 ft.; W. Gháts, 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. Gháts, 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. Gháts, 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, .2-2.5 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. Gháts, 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. Gháts, Papanasham Hills of Tinnevely, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Courtallum Hills of Tinnevelly.

A shrub with stiff leaves and well-marked nerves.

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

W. Gháts, 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. Gháts, 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. Gháts, Sivagiri and Courtallum Hills of Tinnevely (Wight, Beddome).

A nearly glabrous shrub.

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

W. Gháts, hills of Tinnevely at Naterikal and Kaliyayalpil (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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, in W. Nilgiris, Malabar and Tinnevely 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. Gháts, in the Nilgiris, Anamalais and Tinnevely 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. Gháts, in evergreen forests of the Tinnevely 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 intra-petiolar, 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 white2. *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 midrib4. *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. III. 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. Achur; 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 Gháts, 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 Tinnevely (Beddome).

4. *MORINDA UMBELLATA*, Linn.; F. B. I. iii. 157; W. & A. 420. E. Gháts, 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. Gháts, 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. Gháts, 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; cotylédons 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 leaves1. *stricta*.

Branching bushy nearly glabrous herbs with ovate obovate—or lanceolate leaves2. *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. III. t. 128, fig. 1. *R. Munjistia*, Roxb.; Wt. Ic. t. 187.

N. Circars, hills of Ganjam to Godavari; Deccan and Carnatic, in hilly country; W. Gháts, 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 or panicles, white yellow or greenish, bracteolate; pedicels articulate 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. Gháts, Nilgiris, Anamalais, Pulneys and hills of Tinnevely, 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. Gháts, 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 pap-pose. *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 paniced 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-dentate4. *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. 213. W. Gháts, 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. Gháts, 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. Gháts, 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 involucl, often adnate to it and persistent. *Fruit* a dry achene, enveloped in the involucl 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 involucl; cotyledons small, obtuse.

DIPSACUS. LESCHENAULTII, Coult.; F. B. I. iii. 268; Wt. III. 130; W. & A. 445.

W. Gháts, 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

Achenes flattened, glandular; pappus tubular with fimbriate mouth; corollas yellow

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 paniced:—

Herbs, often aromatic, with narrow bracts; pappus 1-seriate, caducous:—

Anther-bases tailed

Anther-bases not tailed

Shrubs or undershrubs with broad bracts; pappus 1-seriate, free or sometimes connate

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

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 everlasting:—

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 opposite30. **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 hairs31. **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 teeth33. **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 bristles35. **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 bristles37. **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 awns39. **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, heterogamous; 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. SENECTIONEAE.—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 truncate50. **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 involucre 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 truncate 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 prominently 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. *phyllolænum*.

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. *anthelminticum*.

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 Tinnevely 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 Tinnevely at 5,000–7,000 ft.

4. *CENTRATHERUM RANGACHARII*, Gamble in Kew Bull. 1920, 338.

Hills of Tinnevely, 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. Gháts, 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. Gháts, in S. Canara and Coorg; Brumagiri Hills of Mysore (Fischer); hills of Tinnevely (Beddome).

A rigid herb with broadly obovate serrate leaves and purple flowers.

4. *Yernonia*, 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. *Involucre* 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, about 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 yellowish10. *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, hairy12. *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, spatulate, obtuse at apex, ashy pubescent, nearly entire, .75–2 in. long16. *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 involucrel 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 involucrel 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 involucrel 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. broad20. *salvifolia*.

Heads many-flowered, .5 in. in diam., the involucrel 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. broad21. *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 involucrel bracts ovate mucronate; achenes 5-angled, smooth, glandular, outer pappus very short22. *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 glands24. *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 glandular25. *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; involueral 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 short29. *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. Gháts, 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. volkammeriaefolia*, Bedd. Fl. t. 225, not of DC.

W. Gháts, hills of Travancore and Tinnevely, 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. Gháts, hills from Ganjam to Godavari, up to 4,500 ft.; hill forests of the Deccan; W. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Nilgiri Hills and Wynaad.

An erect undershrub.

12. *VERNONIA DALZELLIANA*, Drumm. & Hutch. in Kew Bull. 1909, 261.

W. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, hills of Tinnevely, 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 ANAMALICA*, 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 Tinnevely 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. Gháts, 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 of ♀ flowers shortly tubular below, expanding above with 3-4 lobes; leaves sessile, auricled at base, obovate or oblong, pinnatifid, coarsely serrate, 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 above 3,000 ft.; Deccan, in N. Coimbatore Hills; W. Gháts, in all Districts and up to 8,000 ft.

2. *DICHROCEPHALA CHRYSANTHEMIFOLIA*, D.C.; F. B. I. iii. 245; Wt. Ic. t. 1095.

W. Gháts, Nilgiri and Pulney Hills, above 6,000 ft., 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 exerted, 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. Gháts, 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. Gháts, 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, spatulate; 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 fimbriate. *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 Tinnevely (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 spatulate, 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 spatulate, coarsely but regularly serrate; heads 3 in. broad; achenes with few scattered hairs or glabrous1. *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 villous3. *viscidula*.

Heads in racemose panicles, usually loose, about 4 in. broad; leaves long, linear, entire or sometimes remotely serrate, hispidly villous; achenes sparsely silky4. *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 puberulous5. *stricta*.

1. *CONYZA JAPONICA*, Less.; F. B. I. iii. 238.

N. Circars, Mahendragiri Hill at 4,000 ft.; W. Gháts, 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. Gháts, on western side from Wynaad to Tinnevely, 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. Gháts, 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. Gháts, 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 involucre bracts long-hair-tipped; leaves all alternate, semi-amplexicaul, dentate or entire; achenes oblong, not angled or ribbed, pubescent; pappus pink.....1. *amplectens*.

Inner involucre 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; involucre 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, hairy10. *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 spatulate, 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 spatulate, often very pinnatifid, villous15. *laciniala*.

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 ribbed17. *malabarica*.

Stout herbs with heads in clusters at the ends of the many branches; leaves elliptic-lanceolate, acuminate, irregularly toothed; achenes angled and ribbed18. *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. Gháts, 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. Gháts, Nilgiri and Pulney Hills, southwards to those of Tinnevely, 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. Gháts, Pulney Hills and hills of Travancore and Tinnevely, 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. Gháts, 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. Gháts, Nilgiri and Pulney Hills and hills of Tinnevely above 6,000 ft., most common in the Pulneys.

13. *BLUMEA VIRENS*, DC.; F. B. I. iii. 264.

N. Circars, Deccan and W. Gháts 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. Gháts at low elevation.

Var. *gracilis*, Hook. f. Heads quite small, the panicle-branches racemose.

W. Coast, in Malabar (?).

Var. *Gardneri*, Hook. f. Heads large, on large terminal corymbose branches.

W. Gháts, 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. Gháts, Mahendragiri in Ganjam at 4,500 ft. (Gamble,

Fischer and Gage), Rumpa Hills in Godavari (Gamble) ;

W. Gháts, at Coonoor, Nilgiris, 5,000 ft. (C. B. Clarke).

A coarse glandular herb with yellow flowers and stiff, coloured, involucre bracts.

17. *BLUMEA MALABARICA*, Hook. f. ; F. B. I. iii. 267.

W. Coast, in S. Canara and Malabar ; W. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Mysore hills, Nilgiris, Pulneys and hills of Tinnevely, 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. Gháts, 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. Gháts, Courtallum in Tinnevely (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.; involucre bracts longer than the flowers; achenes obovoid, ribbed and glandular, pale1. *divaricata*.
Heads 1-2 in. in diam.; involucre 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 Tinnevely.

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 corymbs1. *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., solitary2. *subsessile*.

1. *BLEPHARISPERMUM PETIOLARE*, DC.; F. B. I. iii. 276;
 Wt. Ic. t. 1092.
 W. Gháts, hills of Tinnevely 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, Ramandrúg 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 BEDDOMI*, Hook. f.; F. B. I. iii. 282.

W. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Coorg, Bababudan Hills of Mysore, Brahmagiris, hills of Coimbatore, N. Nilgiris, Anamalais, Pulneys and hills of Tinnevely, 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. Gháts, 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. Gháts, 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 Tinnevely, 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. Gháts, Nilgiris, Pulneys and hills of Travancore and Tinnevely, 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. Gháts, 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, caducons.

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, acute4. *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. Gháts, 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 sub-compressed, often papillose-scarious; 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 scabrid1. *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. Gháts, 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. Gháts, Anamalais, Pulneys and hills of Travancore and Tinnevely at 3,000-4,500 ft.

An undershrub with much soft wool.

3. *HELICHRYSUM PERLANIGERUM*, Gamble in Kew Bull. 1920. 341.

W. Gháts, 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. Gháts, 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.

CARPESIMUM CERNUUM, Linn.; F. B. I. iii. 300.

Var. *nilagiricum*, C. B. Clarke. *C. nepalense*, Wt. Ic. t. 1120.

W. Gháts, 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 ½ 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 peduncles; 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; involucre bracts erect; pappus of ray-flowers 0.....1. *indica*. Leaves shortly petioled, elliptic-lanceolate, not auricled at base; involucre 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. Gháts, 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.

Involucre 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 Gháts, 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. Gháts, Pulney Hills and hills of Tinnevely 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. Gháts, Mysore, Nilgiri Hills, above 6,000 ft., on the margins of Sholar, 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, spatulate; 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 spatulate 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 ray 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* entire or subsagittate. *Style-arms* of ♀ slender, of ♂ clavate, hairy. *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 subcrenate, 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 URTICAEOFOLIA*, DC.; F. B. I. iii. 306; Wt. Ic. t. 1106.

Var. *Wightii*, DC.

W. Gháts, 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. lineari-folia*, 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 with thick rootstock, pinnatifid basal leaves with narrow lobes, 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. Gháts, Nilgiris, Pulneys and hills of Travancore, 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. Gháts, hills of Ganjam; W. Gháts, 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. Gháts, 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 fimbriate. *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. Gháts, 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. Gháts, 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. Gháts, Nilgiri Hills (C. B. Clarke), at low levels, 1,500-4,000 ft., hills of Tinnevely, 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. Gháts, Courtallum in Tinnevely (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 crispately 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 crispately-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. Gháts, 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. Gháts, 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. Gháts, Pulney Hills and hills of Travancore and Tinnevely, above 4,000 ft.

A slender plant with narrow auricled leaves, said to have purple flowers.

- Var. *paludosa*, Gamble.

W. Gháts, 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. Gháts, Anamalai Hills (Fischer), hills of Travancore and Tinnevely, above 5,000 ft. (Beddome, Barber, Ranga-chari).

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 sub-orbicular, 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. Gháts in Nilgiris, Pulneys and hills of Tinnevely 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. Gháts, 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 fimbriate. *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 spatulate, crenate, subpinnatifid or subentire; cauline linear-oblong or spatulate, 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 spatulate, 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 spatulate, 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. *Walkerii.*

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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Nilgiri Kunds 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. sawatilis*, Hook. f.; F. B. I. iii. 344, not of Wall. *Doronicum Wightii*, DC.; Wt. Ic. t. 1124.

W. Gháts, 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. Gháts, 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. Gháts, 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 Tinnevely 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 Candolleianum*, W. & A.; Wt. Ic. t. 1127.

W. Gháts, 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 Tinnevely, 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 Gháts, 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. Gháts 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. Gháts, 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. Gháts, 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. Gháts, Calcad Hills of Tinnevely, 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. Gháts, 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. Gháts, 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. Gháts, 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 spatulate, 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 sessile, 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 argyranthum*, Wt. Ic. t. 1137-8.

W. Gháts, 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. *Involute* 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 spatulate, 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 spatulate; 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. Gháts, 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* sessile 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* suburceolate 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. Gháts, Nilgiri and Pulney Hills, above 5,000 ft.

An erect coarse herb reaching 4 ft. in height, with rough hispid stem, spatulate 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; Devicolum, 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 fimbriate. *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. Gháts, Nilgiris, Pulneys and hills of Travancore and Tinnevely above 5,000 ft.

A very slender annual with minute yellow flowers.

2. *CREPIS FUSCIPAPPA*, Benth.; F. B. I. iii. 395.

W. Gháts, 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. *Microsorhynchus glabra*, Wt. Ic. t. 1145.

N. Circars, hills of Ganjam, up to 4,500 ft. on Mahendragiri (Fischer and Gage); W. Gháts, 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, paniced 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. Gháts, Nilgiri Hills, about 7,000 ft., in open spots in Shola forest.

A tall herb with bluish-purple flowers.

Lactuca saliva, 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 Tinnevely (Wight).

A perennial scapigerous herb.

2. *LAUNAEA PINNATIFIDA*, Cass.; F. B. I. iii. 416. *Micro-rhynchus 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. III. 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 Tinnevely (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 dehiscent 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 subdecurent.....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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Nilgiris to hills of Tinnevely, 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. Gháts, 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. long2. *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. Gháts, 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. Gháts, 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. Gháts, 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. III. 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*.

ccc

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 Tinnevely (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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, 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. Gháts, Nilgiris,

Anamalais, Pulneys and hills of Tinnevely 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. Gháts, Nilgiris, Anamalais, Pulneys and hills of Travancore and Tinnevely 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. Gháts, 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. Gháts, 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. III. t. 179.

All Districts in the Plains, common, wild or in cultivation.

A rambling subscentent 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 transversely 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. *deltoides*.

1. *LYSIMACHIA LESCHENAUTII*, Duby; F. B. I. iii. 501; Wt. Ic. t. 1204.

W. Gháts, 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. Gháts, 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. Gháts, 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 stems1. *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. Gháts, 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 ruminant; 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 paniced 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. Gháts, 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. Gháts, 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. Gháts, 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 Tinnevely 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. Ghats, Nilgiris, Pulneys and hills of Tinnevely 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. Ghats, 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

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

1. *EMBELIA RIBES*, Burm.; F. B. I. iii. 513. *E. glandulifera*, Wt. Ic. t. 1207.

N. Circars, hills of Vizagapatam, 4,000 ft.; W. Gháts, 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. Gháts, 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 recurved.

3. *EMBELIA GARDNERIANA*, Wt. Ic. t. 1208; F. B. I. iii. 517.

W. Gháts, Sispara Ghát in Nilgiris, at 5,000 ft.

A climbing shrub with white flowers and fruit .25 in. in diam., 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. Gháts, 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, Shevaroy; W. Gháts, 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. *pauciflora*.

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. Gháts, Anamalai Hills and hills of Travancore and Tinnevely, 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. Gháts, 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. Gháts, 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. Gháts, "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. Gháts, Tirrihoot Hills, Wynaad, at 3,000–4,000 ft. (Beddome); Hills of Travancore (Barber).
A glabrous shrub.
6. *ARDISIA SONCHIFOLIA*, Mez Monog. Myrs. 116. *A. villosa*, var. *obtus*a, C. B. Clarke; F. B. I. iii. 525.
W. Gháts, Anamalai Hills, at 4,000 ft. (Beddome, Barber), Sivagiri Hills of Tinnevely (Wight).
Apparently a small tree, with remarkable many-flowered umbels in dichotomous drooping panicles.

7. *ARDISIA MISSIONIS*, Wall. ; F. B. I. iii. 519. *A. courtallensis*, Wt. Ic. t. 1215; F. B. I. iii. 520.

W. Gháts, 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. Gháts, 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 mayúr.

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 ruminant ; 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 XCIY. 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 albuminous6. **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. Gháts, 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. Gháts, 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. *Stocksi*.

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. Gháts, 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. Gháts, 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. Gháts, Nilgiri Hills, in Shola forests, above 4,000 ft.

6. *ISONANDRA LANCEOLATA*, Wt. Ic. t. 350; F. B. I. iii. 539.

W. Gháts, 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.

Atapadi 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 calyx-lobes as in *Isonandra*, but 6 small nearly free petals an

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. Gháts, 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. Gháts, along streams, from S. Canara to

Travancore and Tinnevely, 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. *Tum.*, *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. *PALAEQUIMUM 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. *PALAEQUIM 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 Gháts, 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 Tinnevely 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 XCIV. 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 ruminant; 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 and 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*. Guakoli; *Tel*. Ali, 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 Tinnevely, at 5,000–6,000 ft., in Shola forests; hills of N. Coimbatore.
A small tree.

3. **MABA NIGRESCENS**, Dalz.; F. B. I. iii. 551.

W. Ghâts, 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 ruminant; cotyledons thin, flat.